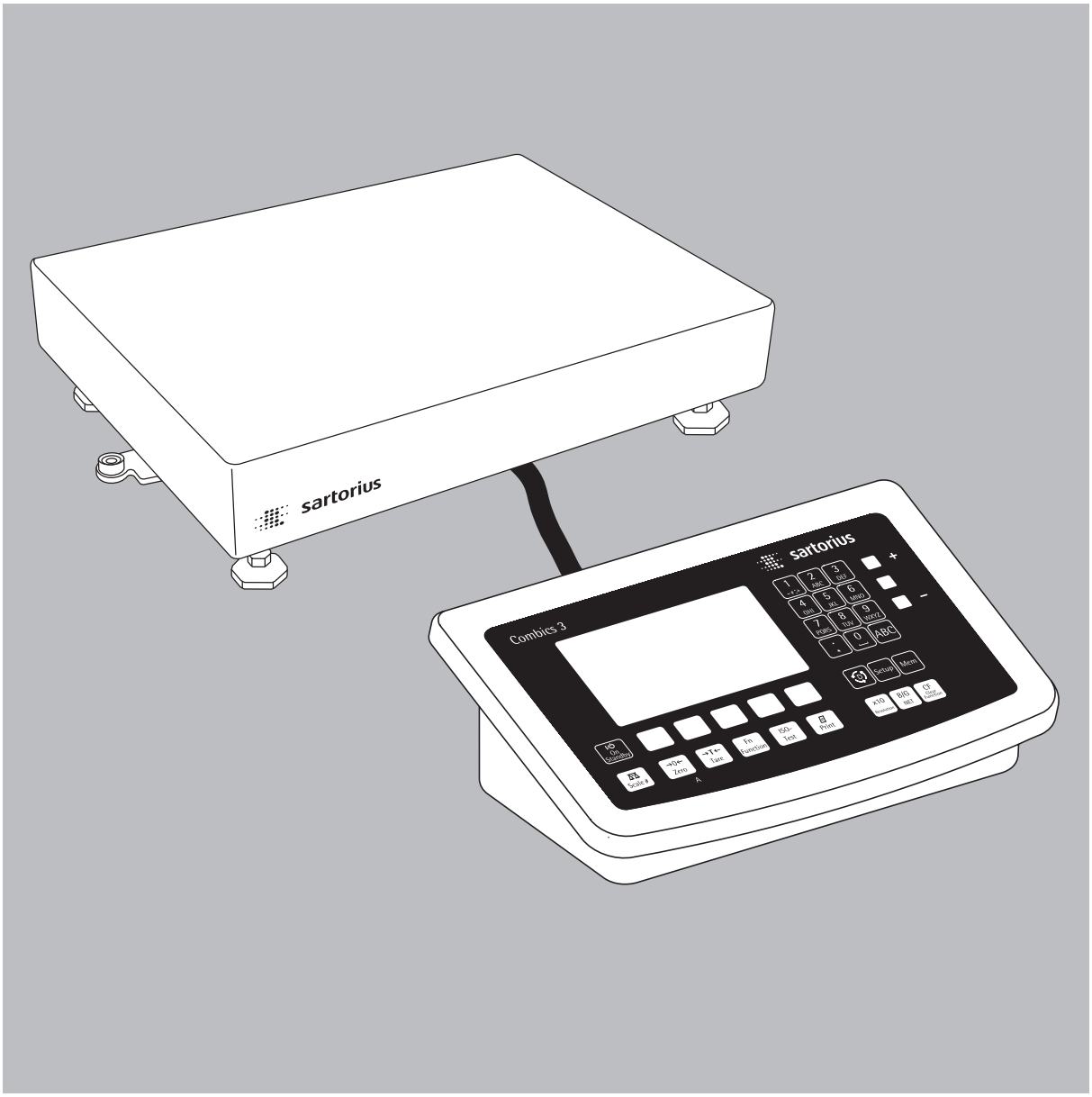
Operating Instructions

Sartorius Combics Series

Complete Scales Models CAW3P | CAW3S | CAH3



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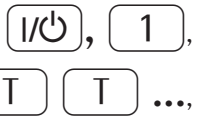
Notes on Using this Manual

- ▶ Please read this entire manual carefully and completely before using the device.
- ▶ Read the safety precautions carefully.
- ▶ This manual is part of the product. Keep it in a safe and easily accessible location.
- ▶ If the manual should be lost or misplaced, please contact Sartorius for a replacement or download the latest manual from our website: www.sartorius-mechatronics.com

Symbols and Signs

The following symbols are used in this manual:

	Warning symbol for various types of dangers. These symbols are explained in more detail in Section “Safety Instructions.“
	This symbol indicates useful information and tips.
	This symbol indicates notes on use in legal metrology within the scope of validity of Council Directive No. 90/384/EEC, replaced by 2009/23/EC (models MS...-.CE...).



This and similar symbols mean that the respective key should be pressed.

This means that this key must be pressed more than once.

- ▶ Indicates a required action
- ▷ Describes the result of an action
1. If a procedure has multiple steps...
2. ... the steps are numbered consecutively.

– Indicates an item in a list

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Warnings and Safety Precautions

Combics indicators comply with the European Council Directives as well as international regulations and standards for electrical equipment, electromagnetic compatibility, and the stipulated safety requirements. Improper use or handling can, however, result in damage and/or injury.

▶ Read these operating instructions carefully before use.
This will prevent damage to the equipment.

The protective conductor must not be disconnected for any reason. Use only standard cables that have protective grounding conductors.

If there is visible damage to the equipment or power cord: unplug the equipment and secure it against further use.

Make absolutely sure to unplug the indicator from power before you connect or disconnect any electronic peripheral devices to or from the interface port.

The device should only be opened by personnel trained in accordance with Sartorius guidelines.

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

The operator shall be responsible for any modifications to the equipment and for any connections of cables or equipment not supplied by Sartorius and must check and, if necessary, correct these modifications and connections.
Information on operational quality is available upon request from Sartorius (in line with norms pertaining to immunity).

Do not expose the equipment to aggressive chemical vapors or to unnecessarily extreme temperatures, moisture, shocks, or vibration.

Only clean the device as stipulated in the cleaning instructions: Refer to the “Care and Maintenance“ chapter.

The display value can be affected by extreme electromagnetic influences. Once the disturbance has ceased, the instrument can be used again in accordance with its intended purpose.

Danger of Explosion!

Do not use this equipment in hazardous areas.

Installation

Warning when using pre-wired RS-232 connecting cables: RS-232 cables purchased from other manufacturers often have pin assignments that are incompatible with Sartorius products. Be sure to check the pin assignments against the chart in this manual before connecting the cable, and disconnect any lines identified differently from those specified by Sartorius.

Connect only Sartorius accessories and options, as these are optimally designed for use with your device. Therefore, do not use any proprietary solutions. The operator shall be solely responsible for installation and testing of any modifications to Sartorius equipment, including connection of cables or equipment not supplied by Sartorius. Information on operational quality (in line with norms pertaining to immunity) is available on request.

▶ If you have any problems with your device, contact your local Sartorius office, dealer or service center.

IP Protection Rating

IP Rating

- All models are rated to IP44 (with option L1: IP65)
- CAWxS models are rated to IP67.
- CAH1E* models: platform IP65, indicator IP69K.
- CAH1G* models: platform IP67, indicator IP69K.
- CAWxS models are rated to IP69K with the “I69“ option.
- Complete scales with secured protective caps must be installed and tested by a certified technician.
- If you install an interface port or battery connection after setting up your indicator, keep the protective cap in a safe place for future use. The cap protects the interface connector from vapors, moisture and dust or dirt.

Use in Legal Metrology

- When the indicator is connected to a weighing platform and this equipment is to be verified, ensure that the applicable regulations regarding verification are observed.
- When connecting Sartorius weighing platforms, observe the “Guide to Verification of Weighing Instruments“ and the Declaration of Conformity with the list of permitted weighing ranges.
- A sticker with the “Sartorius“ logo was affixed to the indicator as a control seal following verification. This seal will be irreparably damaged if you attempt to remove it. This will nullify the verification‘s validity. In this case, re-verification would be required in compliance with all relevant national regulations and laws.

Device Description

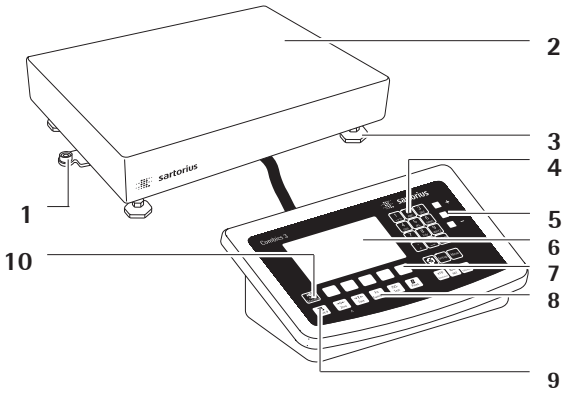
Combics complete scales:
- Are robust and durable, thanks to their stainless steel housing
- Are easy to clean and disinfect
- Are easy to operate, thanks to the following features:
  - Large, backlit, fully graphical dot-matrix display
  - Large keys with positive click action
- Can be operated independently of the weighing platform location
- Have a range of interfaces for flexible use
- Have optional password protection for operating parameters

Combics 3 speeds up your routine procedures with:
- Integrated programs for applications (some can be combined):
  - Counting
  - Neutral Measurement
  - Averaging (animal weighing)
  - Weighing in percent
  - Checkweighing
  - Classification
  - Totalizing
  - Net-total Formulation
- Automatic initialization when the scale is switched on
- Fast response times
- Automatic taring when a load is placed on the weighing platform
- Designation of weight values with up to 4 lines of alphanumeric text
- Can be controlled via two external computers using various protocols
- Barcode scanner connection option for entering tare value or IDs (6 units)
- Possibility to input tare values via the number block
- LED for measurement range identification
- Connection option for a second weighing platform
- Alibi Memory
- Internal rechargeable battery
- Product data memory
- Configurable printout
- FlexPrint

Intended use

The Combics 3 is a robust complete scale for daily production and quality control in industrial applications. Any other use beyond this is considered improper.

General View of the Equipment



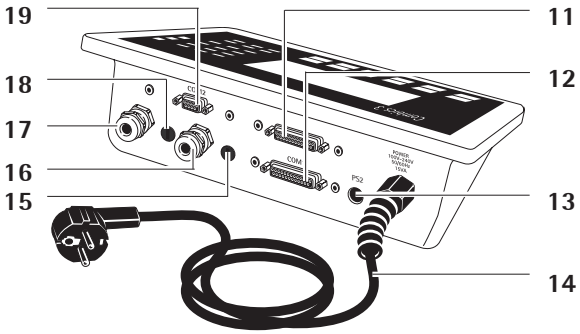
Platform

1 Level indicator
2 Load plate
3 Leveling feet

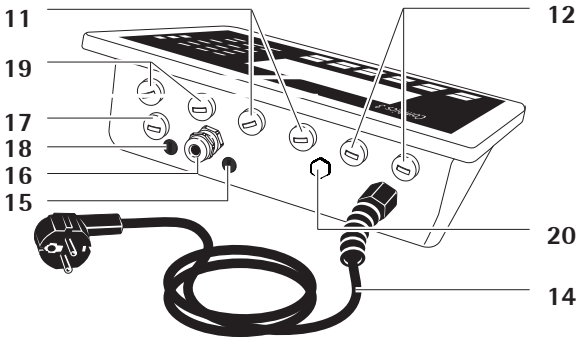
Indicator

4 10 digit keypad for entering alphanumeric values
5 LEDs (for checkweighing and classification)
6 Display (for details, see “Operating Design“ chapter)
7 Additional function keys (see “Operating Design“)
8 General function keys: Zero, Tare, Switch function, Adjustment/ Calibration, Print/Data output (see “Operating Design“)
9 Toggle between weighing platforms (WP)
10 On/Off

CAW3P



CAW3S | CAH3



Rear view of indicator:

11 “UNICOM“
Optional:
- RS-232|RS-485 or 422 interface, e.g. for:
  - PC connection
  - Printer connection
- Digital I/O
- 4 to 20 mA
- Profibus DP
- Ethernet TCP/IP|ModBus TCP

12 RS-232 interface “COM1“
e.g. for:
- PC connection
- Printer connection
- Digital input
- Stop light output

13 “PS2“ e.g. for:
- Keyboard connection
- Barcode scanner connection

14 Power cord with country-specific plug
15 Input for menu access switch (standard or legal-for-trade mode) for WP 1
16 Weighing platform WP 1 connection for analog scales, optional for “xBPI“|“SBI“ scales
17 Weighing platform WP 2 connection, optional for analog scales or “xBPI“|“SBI“ scales
18 Input for menu access switch (standard or legal-for-trade mode) for WP 2
19 RS-232 interface “COM2“
e.g. for:
- PC connection
- Printer connection

20 Vent valve: 1.5 Nm

Installation

When a Combics indicator is ordered with special equipment, the desired options come pre-loaded from the factory.

Storage and Shipping Conditions

⚠ Once the equipment has been removed from the packaging, it may lose accuracy if subjected to strong vibration.

⚠ If the load plate is lifted using a vacuum lifting pad, gloves, safety shoes and safety gear must be worn. Risk of injury!
This work may only be carried out by reliable and authorized personnel.

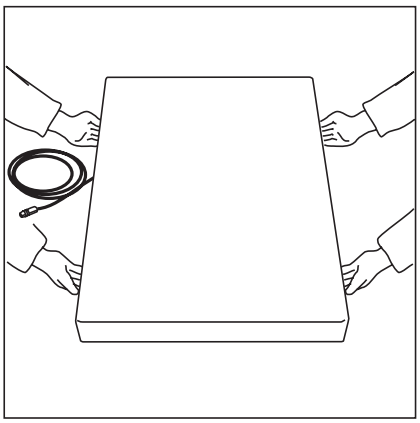
⚠ Suspension points are provided for weighing platforms with an overall size of 1 × 1 m or larger. Do not step under the load during weighing platform/load plate transport or when lifting. Corresponding accident prevention regulations must be followed.
Do not damage the clamp boxes and load receptors during transport.

- Do not expose the equipment to unnecessarily extreme temperatures, moisture, shocks, blows or vibration.
- Permissible storage temperature: –10°C to +40°C

Installation Location

Avoid adverse influences at the place of installation:
- Extreme temperatures (operating temperature: –10°C to +40°C)
- Aggressive chemical vapors
- Extreme moisture (according to IP protection class)

Unpacking



For devices with a platform size of 60 x 80 cm or larger:

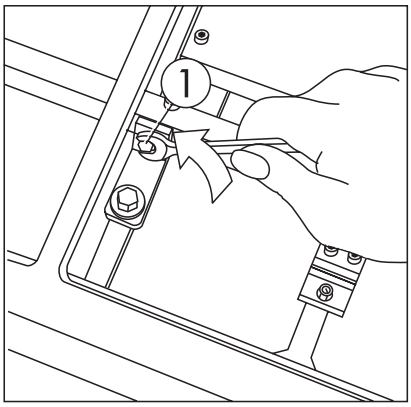
▶ Protective gear must be worn (safety shoes and if required, gloves)
▶ Always lift on the side walls when lifting or transporting the weighing platform.

▶ After unpacking the device, check it for any visible damage as a result of rough handling during shipment.
▷ If you detect any damage, proceed as directed in the chapter entitled “Care and Maintenance“ under “Safety Inspection.“
▶ Save the original packaging for any future transport.
Unplug all connected cables before packing the equipment.

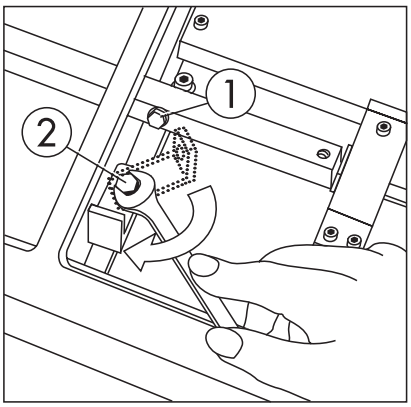
Checking Package Contents

- Indicator
- Weighing platform
- Operating instructions
- Options (special accessories) as listed on the bill of delivery

CAH3 models: Remove transport locks



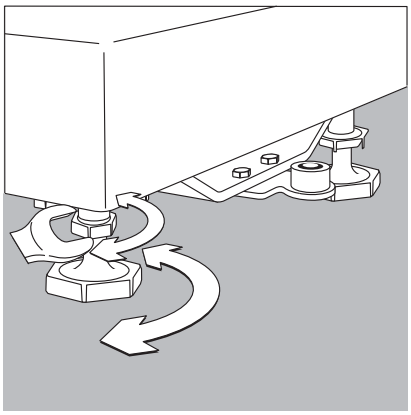
- ▶ Place the weighing platform at its installation location, remove the weighing pan.
- ▶ Remove the transport lock: Remove screw **1**



- ▶ Loosen screw **2**.
- ▶ Turn the mounting bracket 180° and re-secure screw **2**.
- ▶ Re-attach screw **1** to the lever

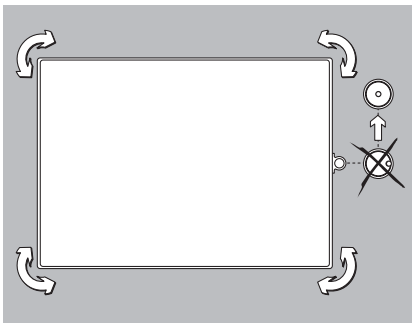
The transport lock must be re-installed before transporting the weighing platform.

Leveling the Weighing Platform

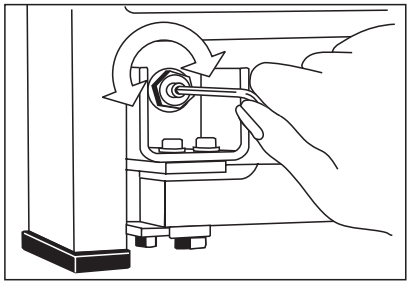


The weighing platform must be exactly level to ensure reproducible weighing results every time. Therefore, the weighing platform must always be re-leveled after it has been moved to a different location.

- ▶ Remove the weighing pan.
- ▶ Loosen the lock nuts using a wrench (SW17).
- ▶ Use a SW5 Allen key to screw the leveling feet in/out.
  Turning the leveling feet clockwise lifts the weighing platform,
  turning the leveling feet counterclockwise lowers the weighing platform.



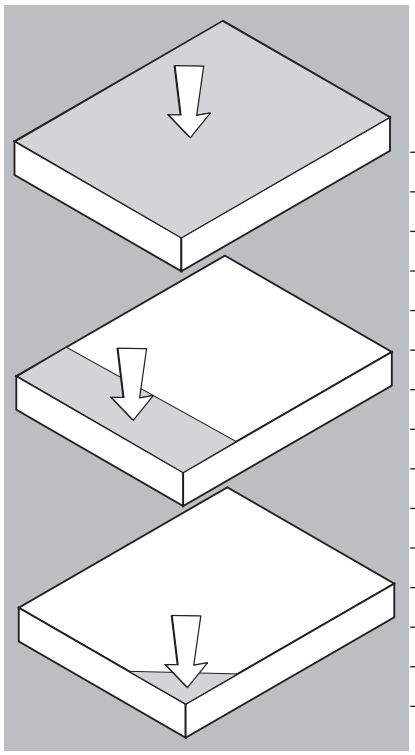
- ▶ Align the weighing platform leveling feet so that air bubble is centered within the circle of the level indicator.
- ▶ Check to ensure that all four leveling feet rest securely on the work surface.
- ▷ Each of the leveling feet must support an equal load.



- ▶ Re-fasten the lock nuts after leveling:
  Small platforms (1 measuring cell) counter to the platform frame,
  large platforms (4 measuring cells) counter to the platform foot.

- ▶ Place the weighing pan on the scale.

Operating Limits



You should not exceed the highest load for weighing platforms.
The highest capacity for the weighing platform is as follows depending on the load used (center, side, one-sided corner load):

Platform size	Center	Side	Corner
320 × 240	50	35	20
400 × 300	130	85	45
500 × 400	300	200	100
500 × 400 P*	600	400	200
650 × 500 S**	450	300	150
800 × 600 P*	1200	800	400
800 × 600 S**	900	600	300
800 × 800	4500	3000	1500
1000 × 800	4500	3000	1500
1000 × 1000	4500	3000	1500
1250 × 1000	4500	3000	1500
1500 × 1250	4500	3000	1500
1500 × 1500	4500	3000	1500
2000 × 1500	4500	3000	1500

* Steel
** Stainless steel

For CAH* models	Platform size	Supported load (center) in kg
	400 × 300	130
	560 × 450	130
	800 × 600	600

Shock Resistance

The weighing platform has a robust design; however, falling weighing samples, side impacts and shocks should be avoided. The weighing platform can withstand loads specified in the DIN standard IEC68 Part 2-27.

Notes on Planning Superstructures

Superstructures must be completely attached before the weighing platform is connected to the power.

The weighing platform is designed for system integration. Scale drawings are the basis for the selection of the required superstructures. The fixing of model CAH*IG* weighing platforms should be carried out using the YAS04IS fastening kit.
Moving or rotating parts on the weighing pan must be designed so that the weighing results are not influenced. Rotating parts should be counterbalanced, for example.
The weighing pan must be free on all sides so that there is no connection between the weighing platform and fixed parts due to falling parts or dirt. Cables and hoses between the weighing platform and other devices may not exert any forces on the weighing platform. These cables may not touch the weighing pan.
When setting up systems in hazardous areas (Zone 2 or 22), any relevant specifications should be observed, e. g.: EN60079-14.
The design should ensure that moving parts do not cause electrostatic discharges (e.g. roller conveyors).

Preload Range (Zero Set Range)

The weight of the superstructures that are attached to the weighing platform is designated as a “preload.“ The preload is electronically compensated for in the weighing platform so that the full weighing range remains available and thus zeroing and/or adjustment (with external weights) is possible.
Greater preloads reduce the weighing capacity. You may not fall below the following weighing range values:

- For CAH*E-16ED... and CAH*E-32ED... a min. 20 kg weighing range must be maintained
- For CAH*E-64ED... and CAH*G-64FE... a min. 35 kg weighing range must be maintained
- For CAH*G-150IG-H and CAH*G-300IG-H a min. 60 kg weighing range must be maintained

The preload must always be set before verification.

Acclimatizing the Device

Condensation can form on the surfaces of a cold device when it is brought into a substantially warmer area.

▶ Allow the device to acclimatize for about 2 hours at room temperature, leaving it unplugged from AC power.

Getting Started

Steps

1.) Set up the weighing platform with the indicator.
2.) Level the weighing platform
3.) Connect peripheral devices, e.g. printer to the COM1 or UNICOM interface: see Data Interfaces chapter starting on page 99
4.) Connecting the device to AC power
5.) Carry out an alignment: for adjustment, see page 27, for linearization see page 24

Connecting Peripheral Devices or Another Weighing Platform

An analog Sartorius platform (CAPP, CAPS) or an IS weighing platform is connected at the factory to the Combics indicator WP1 input.

⚠ The load cell should be connected by a certified technician who has received specialized training from Sartorius. Any installation work that does not conform to the instructions in this manual results in forfeiture of all claims under the manufacturer's warranty.

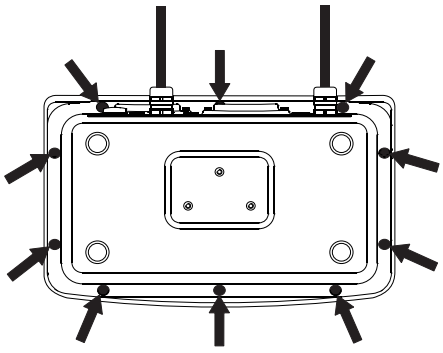
⚠ Peripheral devices should be connected by a certified technician who has received specialized training from Sartorius. Any installation work that does not conform to the instructions in this manual results in forfeiture of all claims under the manufacturer's warranty.

⚠ Disconnect the equipment from the power supply before starting connection work.

▶ Place cables from peripheral devices next to the indicator.

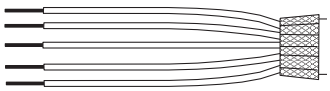
CAW3S, CAH3 (IP69K)

▶ Opening the Combics indicator:
Loosen the ten cap nuts on the front panel. Remove the front panel.



Installing Connection and Interface Cables

⚠ The cable gland (IP69K protection) is pre-mounted on the indicator. Please use extreme caution when performing any work on the equipment that affects this cable gland.
You must use a **torque wrench**. The torque for this cable gland is **5 Nm**.

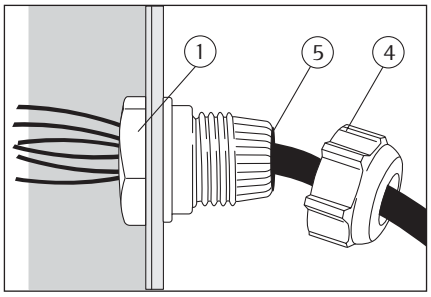


Preparing Cables

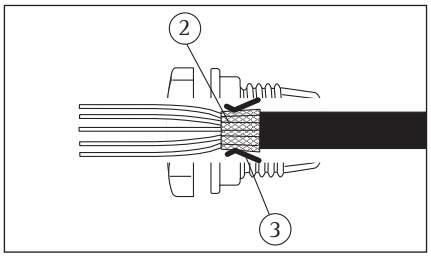
▶ Strip approx. 14 cm from the end of the cable.
▶ Shorten the shielding to approx. 2 cm and pull back over the insulation.
▶ Strip approximately 5 mm of the insulation from the wires of the connecting cable and affix ferrules to the wire ends.

Attaching the Cable Entry

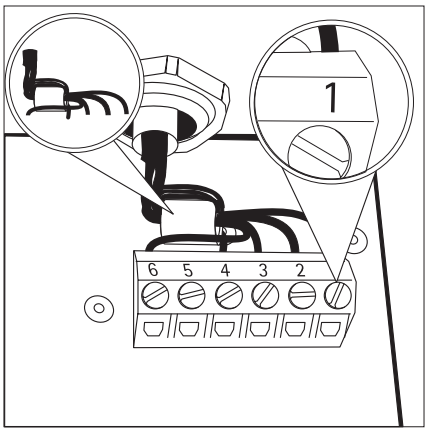
Please use extreme caution when performing any work on the equipment that affects this cable gland.
You must use a **torque wrench**.
The torque for this cable gland is **5 Nm**.



- Remove the protective cap from the bore hole on the indicator.
- Insert the included cable gland through the bore hole and secure from the inside using the locknut (**1**).



- Insert the cable through the cable gland until the shielding (**2**) comes into contact with the clamps (**3**). Tighten the screw-down nut (**4**) until the gasket (**5**) inserted between the screw-down nut and cable forms a small beaded rim.
- Check the shielding and clamps.
- Securely connect the wires of the connecting cable in accordance with the terminal assignments.
- After you close the housing again, use a pressure gauge to check the integrity of the IP69K protection. For details, contact the Sartorius Service Center.



Connecting Cables

- Insert all cable wires through the ferrite case, wind them around the ferrite case and then reinsert back through the ferrite case.
- Screw the wires tightly into the clamps.

See the following pages for terminal pin allocation

- Refer to the data sheet or operating instructions of the weighing platform for details on the assignment of wire colors/signals. Ensure any lines that are not assigned are insulated correctly.
- When connecting a load receptor that uses 4-conductor technology (the cable of the weighing platform to be connected only has 4 lines), connect clamp pairs 1 and 2 (EXC+ und SENSE+), and 5 and 6 (SENSE- und EXC-) with a wire jumper.

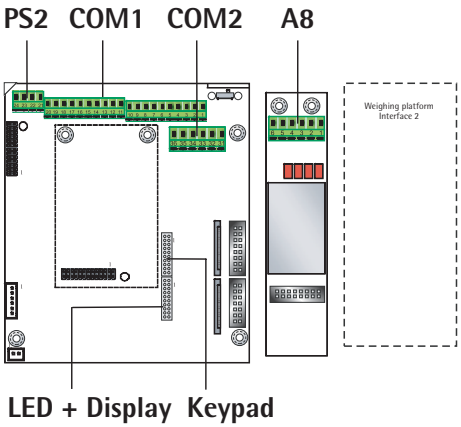
Connecting an IS Weighing Platform to a Combics 3

You can connect an IS weighing platform to WP2.

Features

- IS weighing platforms process weighing data independently of the indicator.
- Internal adjustment option
- IS...-0CE models: have a separate approval number, printed on a tag that is affixed to the cable.
- Please observe the conditions described in the manual for the weighing platform you connect.

Connecting Peripheral Devices or a 2nd Weighing Platform: Combics 3, Model type CAW3S | CAH3



Digital PCB

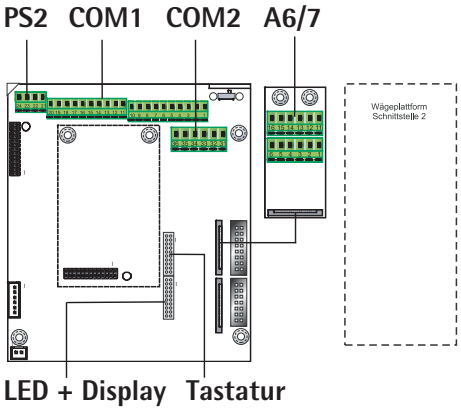
COM1, COM2 and PS2 terminal assignments (applies to all PCBs)

				PS2	
1	LOAD_PRINTER	**11**	Clear to send (CTS)	**21**	5 V switched
2	RESET_OUT	**12**	Data terminal ready (DTR)	**22**	**PS/2**_data
3	GND	**13**	Data input (RXD)	**23**	**PS/2**_clock
4	GND	**14**	Data output (TXD)	**24**	GND
5	5V_OUT	**15**	GND	**COM2**	
6	5V switched	**16**	Universal In	**31**	CTS_COM2
7	GND	**17**	Control output: “lower“	**32**	DTR_COM2
8	GND	**18**	Control output: “equal“	**33**	RXD_COM2
9	n.c.	**19**	Control output: “heavier“	**34**	TXD_COM2
10	LINE_OUT	**20**	Control output: “set“	**35**	GND
				36	GND

A8 terminal assignments

1	EXC+	Bridge supply voltage (+)
2	SENSE+	Sense (+) for bridge supply voltage
3	OUT+	Measuring voltage positive
4	OUT-	Measuring voltage negative
5	SENSE-	Sense (-) for bridge supply voltage
6	EXC-	Bridge supply voltage (–)

Keys
LED + Display

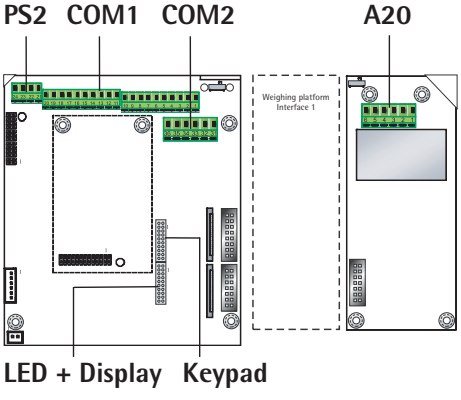


Interface PCB for RS-232/485 for IS weighing platform (option A6/A7)

A6/7 terminal assignments

1	CTS	**11**	TxD/RxD+
2	DTR	**12**	TxD/RxD-
3	RxD	**13**	LINE_OUT
4	TxD	**14**	LINE_OUT
5	GND	**15**	GND
6	Adjustment Lock	**16**	GND

Keys
LED + Display

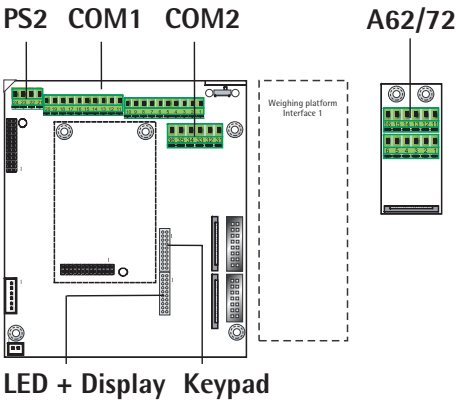


Interface PCB for ADC 10.000e (option A20)

A20 terminal assignments

1 EXC+
2 SENSE+
3 OUT+
4 OUT-
5 SENSE-
6 EXC-

Keys
LED + Display



Interface PCB for RS-232/485 for IS weighing platform (option A62/A72)

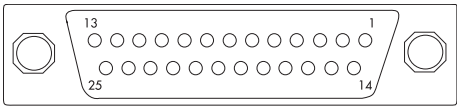
Interface PCB A6/7 and A62/72

1	CTS	**11**	TxD/RxD+
2	DTR	**12**	TxD/RxD-
3	RxD	**13**	LINE_OUT
4	TxD	**14**	LINE_OUT
5	GND	**15**	GND
6	Adjustment Lock	**16**	GND

Keys
LED + Display

Interface Pin Assignment Chart COM1

Model type CAW3P (IP44 protection)



COM1 female connectors:
25-pin D-Submini female connector (DB25S) with screw lock hardware for cable gland

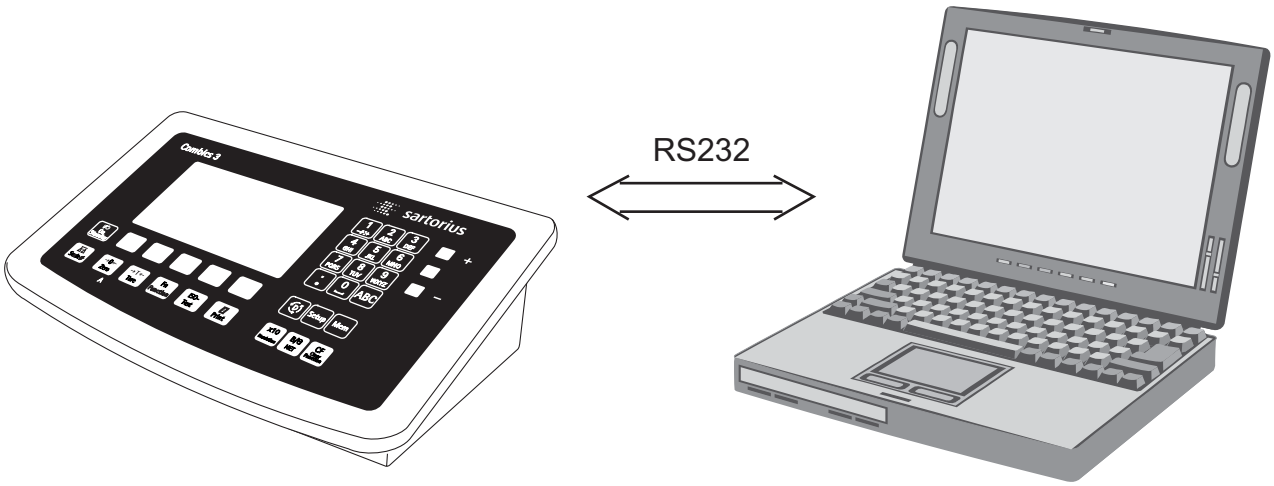
Recommended interface connector:
25-pin D-Submini (DB25) with shielded cable clamp assembly and shield plate (Amp type 826 985-1C) and fastening screws (Amp type 164868-1)

COM1 pin assignments

Pin 1: Shield
Pin 2: Data output (TxD)
Pin 3: Data input (RxD)
Pin 4: GNO
Pin 5: Clear to send (CTS)
Pin 6: Not assigned
Pin 7: Internal ground (GND)
Pin 8: Internal ground (GND)
Pin 9: Not assigned
Pin 10: Not assigned
Pin 11: +12V for printer
Pin 12: RES_OUT\
Pin 13: +5 V switch
Pin 14: Internal ground (GND)
Pin 15: Universal switch
Pin 16: Control output: “lower“
Pin 17: Control output: “equal“
Pin 18: Control output: “heavier“
Pin 19: Control output: “set“
Pin 20: Data terminal ready (DTR)
Pin 21: Ground power supply (GND)
Pin 22: Not assigned
Pin 23: Not assigned
Pin 24: Power supply +15..25 V (peripherals)
Pin 25: +5 V

Connecting a PC via Interface COM1

Use the following cables to connect a PC to the indicator in accordance with the RS-232C/V24 standard (max. cable length 15 m):
Model type CAW3P: connecting cable 7357312
Model type CAW3S | CAH3: connecting cable YCC02-D09F6



Pin assignment

Pin assignments for the cable from the indicator to an RS-232 PC interface (COM1).

Indicator side **PC side**

Model type **CAW3P**
25-pin D-Sub male connector
DSUB connector
9-pin or 25-pin

	1			
Sgn GND	7	5 GND	7	GND
TxD	2	2 RxD	3	RxD
RxD	3	3 TxD	2	TxD
DTR	20	8 CTS	5	CTS
CTS	5	4 DTR	20	DTR

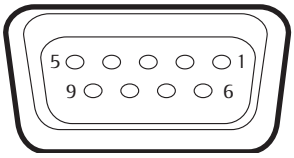
Model type **CAW3S | CAH3**
Open cable end
DSUB connector
9-pin or 25-pin

Sgn GND	15	5 GND	7	GND
TxD	14	2 RxD	3	RxD
RxD	13	3 TxD	2	TxD
DTR	12	8 CTS	5	CTS
CTS	11	4 DTR	20	DTR

Interface Pin Assignment Chart COM2

Model type CAW3P (IP44 protection)

COM1 female connectors:
25-pin D-Submini female connector (DB25S) with screw lock hardware for cable gland



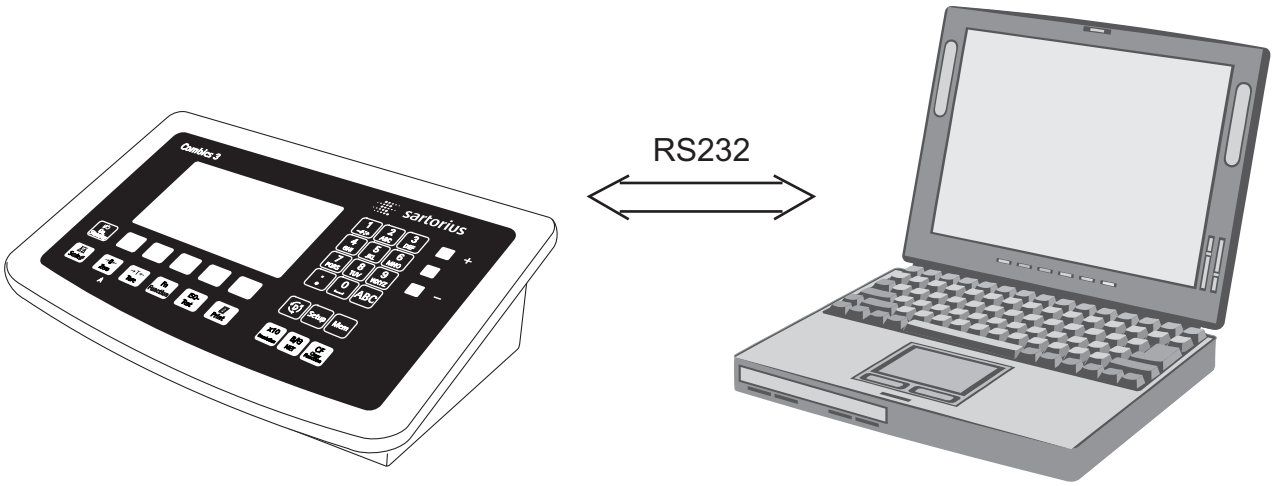
Recommended interface connector:
25-pin D-Submini (DB25) with shielded cable clamp assembly and shield plate (Amp type 826 985-1C) and fastening screws (Amp type 164868-1)

COM1 pin assignments

Pin 1: Shield
Pin 2: Data output (TxD)
Pin 3: Data input (RxD)
Pin 4: GNO
Pin 5: Clear to send (CTS)
Pin 6: Not assigned
Pin 7: Internal ground (GND)
Pin 8: Internal ground (GND)
Pin 9: Not assigned
Pin 10: Not assigned
Pin 11: +12 V for printer
Pin 12: RES_OUT\
Pin 13: +5 V switch
Pin 14: Internal ground (GND)
Pin 15: Universal switch
Pin 16: Control output: “lower“
Pin 17: Control output: “equal“
Pin 18: Control output: “heavier“
Pin 19: Control output: “set“
Pin 20: Data terminal ready (DTR)
Pin 21: Ground power supply (GND)
Pin 22: Not assigned
Pin 23: Not assigned
Pin 24: Power supply +15..25 V (peripherals)
Pin 25: +5 V

Connecting a PC via Interface COM2

Use the following cables to connect a PC to the indicator in accordance with the RS-232C/V24 standard (max. cable length 15 m):
Model type CAW3P: connecting cable 7357312
Model type CAW3S | CAH3: connecting cable YCC02-D09F6



Pin assignment

Pin assignments for the cable from the indicator to an RS-232 PC interface (COM1).

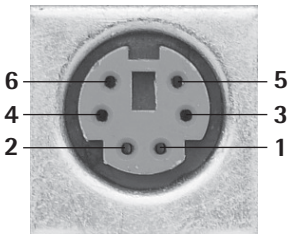
Indicator side **PC side**

Model type **CAW3P**
25-pin D-Sub male connector
DSUB connector
9-pin or 25-pin

	1			
Sgn GND	7	5 GND	7	GND
TxD	2	2 RxD	3	RxD
RxD	3	3 TxD	2	TxD
DTR	20	8 CTS	5	CTS
CTS	5	4 DTR	20	DTR

Model type **CAW3S** | **CAH3**
Open cable end
DSUB connector
9-pin or 25-pin

Sgn GND	15	5 GND	7	GND
TxD	14	2 RxD	3	RxD
RxD	13	3 TxD	2	TxD
DTR	12	8 CTS	5	CTS
CTS	11	4 DTR	20	DTR



Interface Pin Assignment Chart PS2

Model type CAISL (IP44 protection)

PS2 female connector:

6-pin miniature socket PS2 (Mini-DIN)

Recommended interface connector:

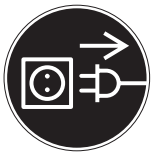
6-pin miniature socket PS2 with integrated shielded cable clamp assembly

Pin assignment:

Pin 1: Keyboard data (data interface cable)
Pin 2: Not assigned
Pin 3: Internal ground (GND)
Pin 4: +5V switched
Pin 5: Keyboard clock
Pin 6: Not used

Connecting a Bar Code Scanner

Accessory YBR02CISL



▶ Disconnect the indicator from AC power (unplug the AC adapter)

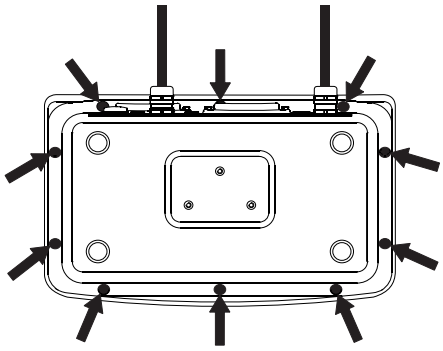
For CAW3P models:

▶ Connect the barcode scanner via PS/2.

For CAW3S | CAH3 models:

▶ Pin assignment, see “Connecting Peripheral Devices“ (implemented via the YCC02-BR02 connecting cable or as option M8) on page 14.

NOTE: This equipment has been tested and found to comply with the limits pursuant to part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. For information on the specific limits and class of this equipment, please refer to the Declaration of Conformity. Depending on the particular class, you are either required or requested to correct the interference. If you have a Class A digital device, you need to comply with the FCC statement as follows: “Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.“



Closing the Combics Indicator

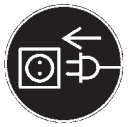
▶ Re-attach the front panel and secure it with the ten cap nuts (**1Nm**).

Connecting the Device to AC Power

The indicator is powered through the pre-installed power cord. The power supply is integrated into the indicator. The device can be operated with a supply voltage of 100 V to 240 V.

The power connection must be made in accordance with the regulations applicable in your country.

The printed voltage rating (see type label) must match the voltage in the place of installation. If the voltage specified on the label or the plug design of the AC adapter do not match the rating or standard you use, please contact your Sartorius office or dealer.



▶ Check the voltage rating and plug design.
▶ The device must be plugged into a properly installed wall outlet.

Protection Class 1 Device

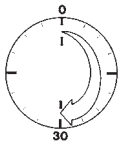
▶ The device must be plugged into a properly installed wall outlet which has a protective grounding conductor (PE).

Safety Precautions

If you use an electrical outlet that does not have a protective grounding conductor, ensure that an equivalent protective conductor is installed by a certified electrician (as specified in the applicable regulations for installation in your country).
The protective effect must not be negated by using an extension cord without a protective grounding conductor.

Before using for the first time, any superstructure parts must be completely installed. Avoid connecting the equipment to lines that have a heavy electrical load, e.g. compressors, large machinery, etc.

Warm-up Time



To deliver exact results, the device must warm up for at least 30 minutes after connection to AC power. Only after this time will the device have reached the required operating temperature.

Using a Verified Device in Legal Metrology

M

Ensure that there is a warm-up time of at least 24 hours after connection to the power supply.

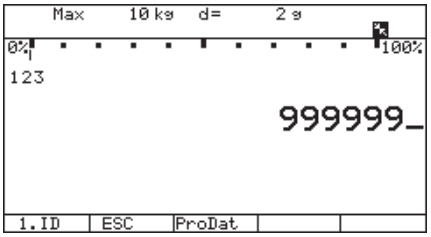
Configuring Weighing Platforms

Service-Mode

Purpose The Service mode enables access to additional menu items in the Setup menu which are not displayed when the Service mode is not active. The most important calibration and adjustment work for the indicator and for the connected weighing platform can be carried out in the Service menu, e.g. ADC configuration.

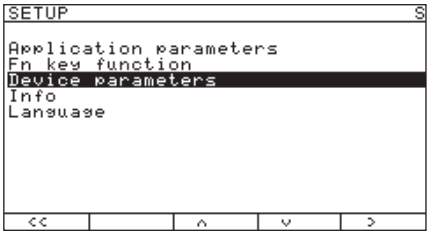
When the Service mode is active, an "**S**" is shown in the top right-hand corner of the display. To deactivate the Service mode, restart the indicator (turn the indicator off and back on again).

Activating the Service Mode

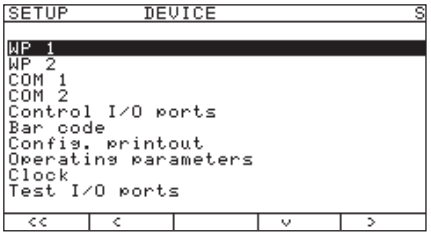


- ▶ Press (I/⏻) to turn on the device.
- ▷ When turned on the scale is in an application program.
- ▶ Enter the service password (see Appendix General User Password) and press (SETUP) to confirm.

- ▷ The device in now is Service mode. An "S" appears in the top right-hand corner of the display.
- ▶ Press the "v" soft key several times to select the "Device parameters" line.



- ▶ Press the ">" soft key.
- ▷ The "Device" submenu will open.



- ▶ Select and open the corresponding submenu. Repeat this procedure until the desired menu item in the lowest menu level can be opened.
- ▶ View or change the menu item (confirm with "↵") and use "<" to return to the previous menu.
- ▶ Press (SETUP) or "<<" to exit the Setup menu.

Exiting Service Mode

Turn the device off and then on again to return to the normal application mode. If you exit the Setup menu without changing settings by confirming with (SETUP) or the "<<" soft key, the Service mode will remain active. Press the (SETUP) key to re-open the Setup menu.

Overview of the Setup Menu in Service Mode

o = Factory setting
x = User-defined setting

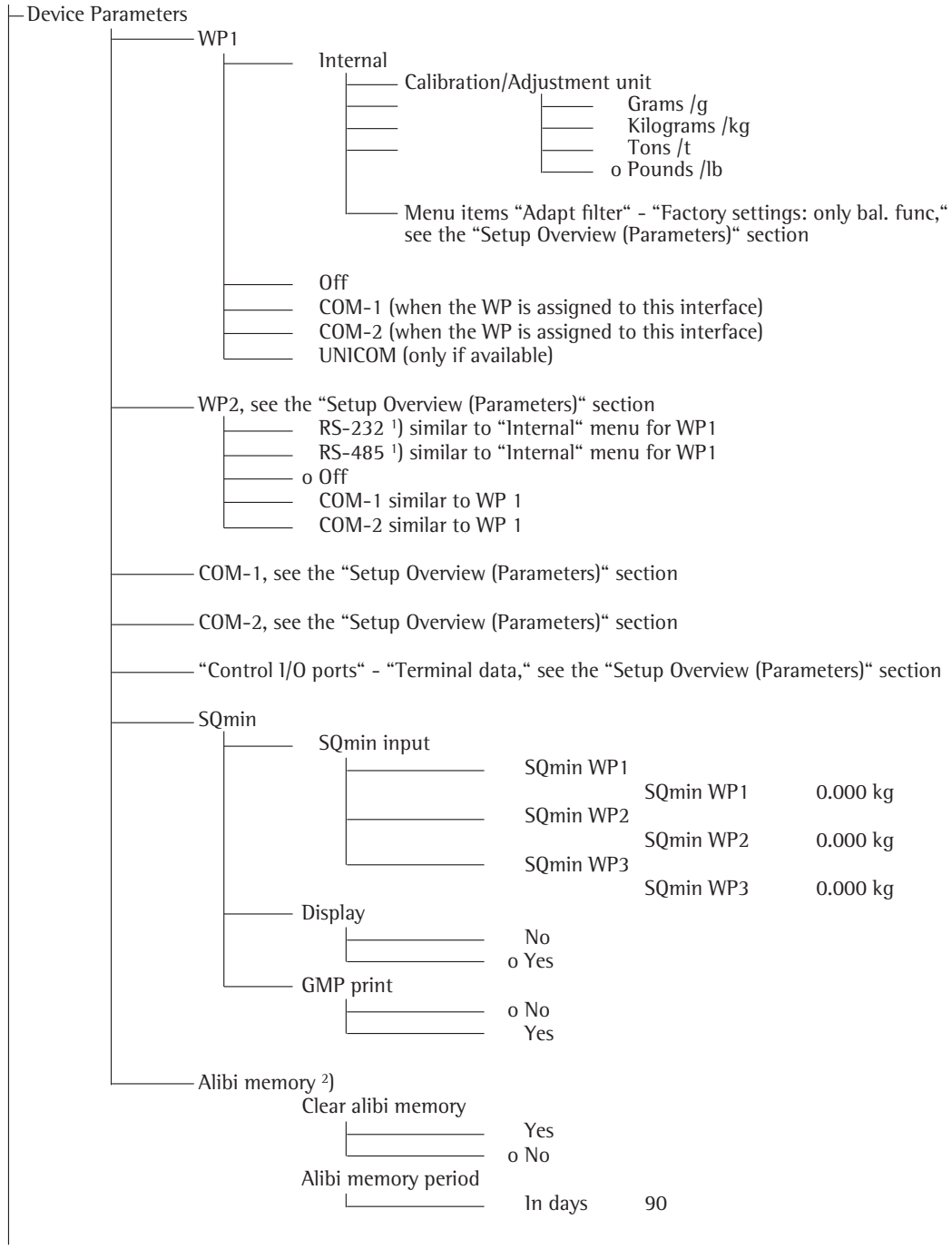
Service password entry

Setup
- Application parameters, please refer to the “Basic Application Programs” manual
- Fn key “Setup Overview (Parameters)“
- Device parameters
- Info, see the “Setup Overview (Parameters)“ section
- Language, see the “Setup Overview (Parameters)“ section

Setup access with service password

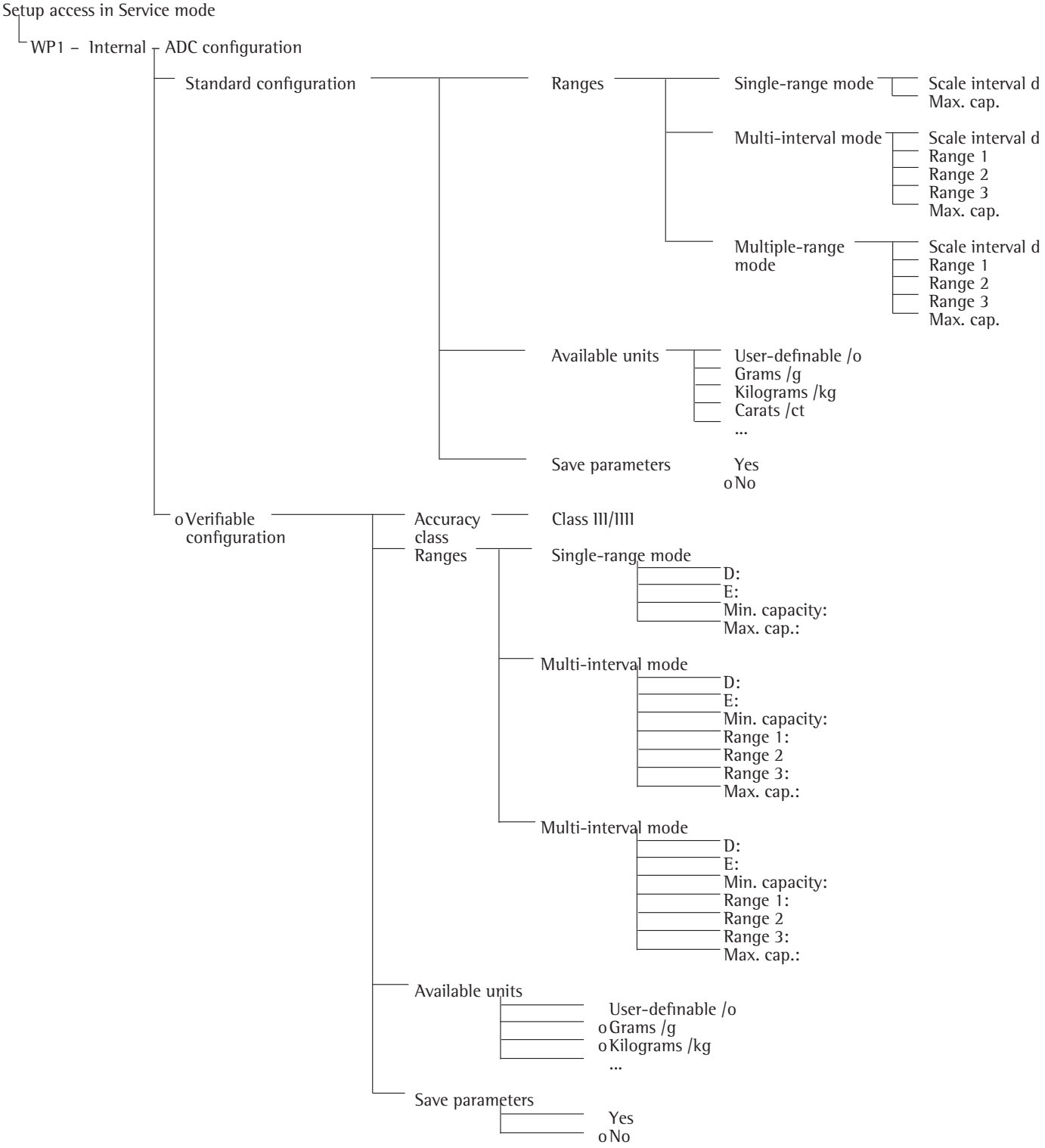
- Device parameters
  - WP1
    - RS-232 [1])
      - SBI standard
      - SBI verifiable
      - o IS-232
      - ADC-232
    - RS-485 [1])
      - o IS-485
      - ADC-485
    - Internal
      - ADC configuration (see the “Setup Menu for ADC Configuration“ section)
      - Calibration/Adjustment
        - CAL key function
          - o Ext. cal./adj.; factory-def. wt.
          - Ext. cal./adjust.; user-defined weight
          - Ext. lineariz.; factory-def. wts
          - Ext. lineariz.; user-def. wts
          - Set preload [2])
          - Delete preload [2])
          - Key blocked
        - Cal./adj. sequence
          - Cal. then auto adjust
          - o Cal. then manual adjust
        - isoCAL function [3])
          - o Off
          - Adjustment prompt
        - Activate external adjustment [2])
          - o Activated
          - Deactivated
        - Parameter for external weight
          - Cal./adj. weight:
          - Lin. weight 1...4:
        - Adjust without weights [2])
          - Input parameters
            - Nominal load:
            - Resolution:
            - Sensitivity 1...4:
          - Save parameters
            - Yes
            - o No
        - Geographical data [2])
          - Input parameters
            - Geographical latitude
            - Altitude
            - Gravitational acceleration
          - Save parameters
            - Yes
            - o No

[1]) Equipment version: – then blocked internally
[2]) Not available on devices verified for use in legal metrology
[3]) Only when operated with Sartorius IS weighing platforms or an external ADC



1) Equipment version: – then saved internally
2) Only if alibi memory is available (option)

Setup Menu for A/D Converter Configuration



Analog/Digital Converter (ADC)

Purpose

Adjust the parameters of the analog/digital converter to the connected load cell or weighing platform. After ADC configuration, the ADC in connection with the load sensor is defined as a scale.

Once the ADC configuration has been locked, the indicator can no longer be used to influence weighing results. The scope of functions available in the weighing instrument is defined by the A/D converter. Weighing functions that can be activated include reading weight values, taring, adjustment, reading the tare value, saving/deleting the tare entry.

Setup Information

- ADC configuration is only possible when the menu access switch is open. Re-close the menu access switch after ADC configuration.
- Before ADC configuration, you must first set whether or not the weighing platform will be used as a standard or verifiable weighing platform.
- ADC configuration is carried out in the Service mode in the Setup menu under “WP 1“ for the first weighing platform and “WP 2“ for the second.
- Entries made in ADC configuration will not be affected by a menu reset (returning the setup parameters to their factory settings).

See also the overview in the “Setup Menu for A/D Converter Configuration“ section.

Setting Parameters for ADC Configuration

Standard or Verifiable Configurations

In ADC configuration, you must first select whether the weighing platform should be configured as a standard or verifiable (for use in legal metrology) weighing platform.

- Standard configuration “Standard“
- Verifiable configuration “VeriVable“

Select using the “^“ or “v“ soft key. Press the “>“ soft key to confirm the setting and open the Configuration menu.

Accuracy Class

This menu item is not shown when the Standard configuration is active. When the Verifiable configuration is active (for weighing platforms verified or verifiable for use in legal metrology), only Class (III)/(IIII) can be selected. Activate the “Accuracy class“ menu item, select “Class III/IIII“ and confirm your selection using the “↵“ soft key.

Ranges

The capacity of the weighing platform can be divided into multiple ranges:

- “Single-range mode“:
  The entire weighing range is divided into scale intervals on the basis of the lowest interval d and the maximum load.
- “Multi-interval mode“:
  The “Multi-interval mode” function divides the weighing capacity into as many as four ranges, each with a different readability. Corresponding changes take place automatically. Once the scale has been tared, the highest possible resolution is available even if the weighing platform is loaded with a higher weight. This is only permitted in the accuracy classes (III)/(IIII) for the verifiable configuration.
- “Multiple-range mode“:
  Multiple-range mode has two or three weighing ranges. When the range limit is exceeded, the scale switches into the next highest weighing range (lower resolution) and remains there. The scale can be returned to the lower weighing range (higher resolution) only by pressing the →0← key and then unloading the scale.

Select the desired configuration using the "^" or "v" soft key. Confirm your selection using the ">" key. Make additional settings in the submenu: scale interval d/verification scale interval e, minimum load (Verifiable configuration only), range limits (Multi-interval or Multiple range mode only) and maximum capacity. Confirm using the "↵" soft key or cancel using "Esc."

Scale Interval d

Scale interval d indicates the resolution of the weighing instrument.
The scale interval d can be entered only in increments of 1, 2, 5, 10, 20, etc.
When using verifiable or verified weighing platforms, the scale interval d is the same as the verification scale interval e.

Verification Scale Interval e

The verification scale interval e indicates the resolution of the weighing instrument in legal metrology. The verification scale interval e can be entered only in increments of 1, 2, 5, 10, 20, etc. For weighing instruments of accuracy class (III) or (IIII), e = d. This is why the scale interval d does not need to be entered separately.
When "Standard configuration" is used, this menu item is not displayed.

Minimum Capacity (Min. Cap.)

When "Standard configuration" is used, this menu item is not displayed. The minimum load of the connected weighing platform is entered under this menu item. The minimum load for scales of accuracy class (III) is 20 e and 10 e for class (IIII).

Important Note:

The function of the minimum load setting is to warn operators that below this limit, the summation of tolerances might lead to significant measurement errors. In Germany, for example, initial weights below the minimum load are not allowed.

Maximum Capacity (Max. Cap.)

The maximum capacity is the maximum load that may be placed on the weighing instrument. When heavier weights are used the weighing instrument displays overload "H." The scale intervals of the weighing instrument are calculated using the maximum load and the scale interval d (e.g. max. capacity = 15.000 kg, smallest scale interval d = 0.005 kg yields 3000 scale intervals).
In legal metrology the total number of intervals must be no more than 3000 e, and when using multi-interval scales there must not be more than 3000 e intervals per range.
In standard operation, as opposed to legal metrology, you can define a "Super Range" weighing instrument of over 3000 intervals. These parameters, however, may be influenced by physical restrictions.

Range 1, Range 2, Range 3

The range limits are entered for the individual ranges. The accuracy changes when these limits are exceeded. The following applies when entering limits: range 1 ≤ range 2 ≤ range 3 ≤ maximum capacity.
This means that the weighing range can be divided into a maximum of 4 ranges. The resolution changes at intervals of 1, 2, 5, 10, 20 etc., where the lowest resolution is the smallest scale interval entered. Set ranges that are not required for use to zero.

Available Units

With this function, you can make particular weight units (weight unit x, x=1, 2) inaccessible during weighing. Available units are indicated by a * on the display (more than one can be selected).
To enable or disable a unit, select the unit by pressing the "^" or "v" soft key, and then press the "↵" soft key (toggle function).

Saving Parameters

To save the ADC configuration, use the ">" soft key to select "Yes" and confirm with the "↵" soft key. The device software is reset, and the scale returns to the normal weighing mode. To exit the menu without saving configuration changes, press the "<" soft key.
Once these parameters have been configured, the A/D converter in conjunction with the load cell(s) is defined as a weighing instrument. The A/D converter, in conjunction with the weighing platform, can now be used like any standard weighing platform. In addition, the weight unit must be defined and the weighing platform adjusted (calibration, adjustment and linearization must be performed). For a detailed description of these procedures, see the "Adjustment in Service Mode" section.

Analog/Digital Converter (ADC) Configuration

Condition

The weighing platform must already be connected.

Open the Menu Access Switch

The menu access switch is located on the back of the indicator right next to the weighing platform connection.

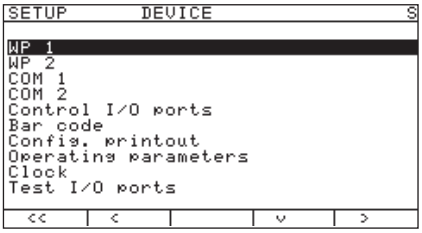
- ▶ Remove the cap.
- ▶ Slide the switch to the left (= "open" position).

Activating the Service Mode

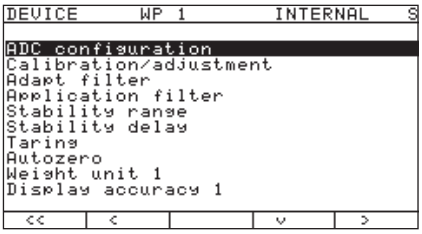
- ▶ See "Service Mode" on page 17.

Configuration

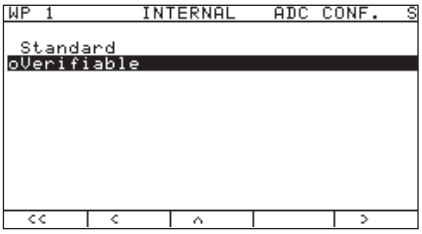
- ▶ Select weighing platform "WP 1."



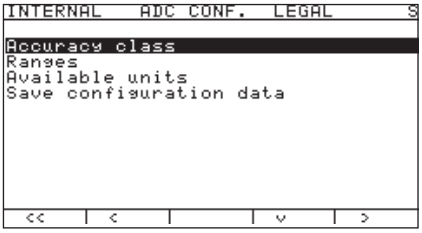
- ▶ If the "Internal" setting is not already activated (marked by "o"), select the setting using the "^" or "v" soft key and confirm with ">."
- ▷ The message "Function active" appears briefly. The "WP 1 internal" menu will then open.



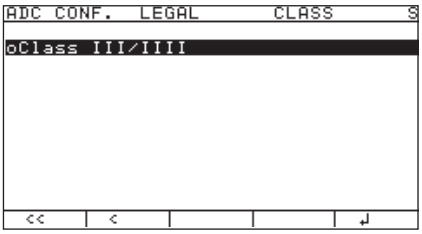
- ▶ Open the ADC ConVguration menu.
- ▶ Select the desired configuration data record using the "^" or "v" soft key: "Standard" or "VeriVable" (verifiable configuration).
  The default setting depends on the data record.



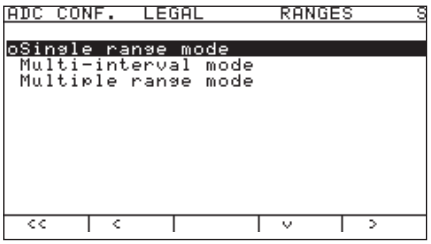
- ▶ Open the menu for configuring A/D converter parameters. In this example, the menu for ADC configuration of a weighing platform for use in legal metrology is opened.
  If "Standard" was selected previously, then the "Accuracy class" is not displayed.



- ▶ Open the first menu item.
  For a standard configuration, the "Ranges" menu item, for a verifiable configuration, the "Accuracy class" menu item.
  When the "Verifiable" configuration is active, always select the "Accuracy class" menu item first.
- ▶ Set accuracy class (III)/(IIII). The "o" symbol should mark the setting, if required confirm using the "↵" soft key.
- ▶ Press the "<" soft key to exit the menu item.



- ▶ Open the "Ranges" menu item.



In the example shown here, "Single range mode" has been selected (marked by "o").

- ▶ To select a different weighing range configuration, use the "^" or "v" soft key to select the corresponding line and open the selected menu using the ">" soft key.
- ▷ The selected weighing range configuration is now active. When you return from the input menu for entering the weighing range parameters, the new range configuration is marked by a "o."

For more information about range configuration, please see "Setting Parameters for ADC Configuration."
The default values displayed depend on the data record loaded and might have to be changed. In the example shown here, the A/D configuration is set with a "Verifiable" data record in single-range mode.

Single-range Mode

- ▶ Select the individual input fields using the "^" or "v" soft key.
- ▶ For numeric input: use the [0] ... [9] keys and the [·] key (decimal point). Make corrections using [CF].
- ▶ Confirm using the "↵" soft key.
  If other parameters follow the one just entered, the highlight bar is automatically positioned on the next input field.
  To cancel numbers entered: press the "ESC" soft key.
- ▶ Use the "<" soft key to go to the next menu level.
- ▷ This will apply all parameters.
- ▶ Press [SETUP] or "<<" to exit the Setup menu.

[0] [·] [0] [0] [2]

In the example shown here, a single-range scale in "Verifiable" configuration with a maximum capacity of 6.000 kg is modified; the verification scale interval e is changed from 0.001 kg to 0.002 kg, in accordance with the maximum permitted value of 3000 verification scale intervals. Press the "↵" soft key to confirm the changed value.
The highlight bar is automatically positioned on the "Min. cap." field.

The following values apply for the minimum load for verifiable scales:
- For class I: Min. cap. = 20 e
- For class m: Min. cap. = 10 e

A verification scale interval that is changed, therefore, also affects the minimum load. Changing the verification scale interval "e" is automatically applied to the "Min. cap."

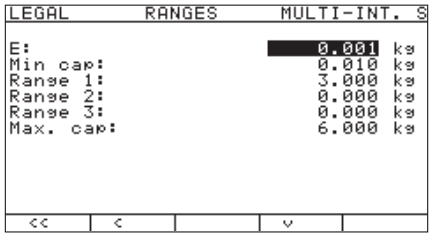
You can also change this value manually:
In the example, the minimum capacity must be increased to 0.04 kg for class (III).

- ▶ Press the following keys in sequence: [0] [·] [0] [4] [0] and confirm using the "↵."
- ▷ The highlight bar is automatically positioned on the "Max. cap." field.

- ▶ The value for the maximum capacity is not changed. For this example, the input of parameters for single-range mode in the "Verifiable" configuration is now concluded.
- ▶ Use the "<" soft key to go to the next menu level.

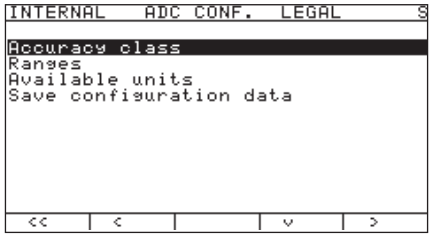
Multi-interval Mode

The illustration shows an example of the input menu opened for multi-interval mode range configuration. This example shows the parameters for a scale in "Verifiable" configuration, with 2 weighing ranges and a maximum capacity of 6.000 kg.



– Range 1: 0...3.000 kg with e1 = 0.001 kg
– Range 2: 3.002...6.000 kg with e2 = 0.002 kg

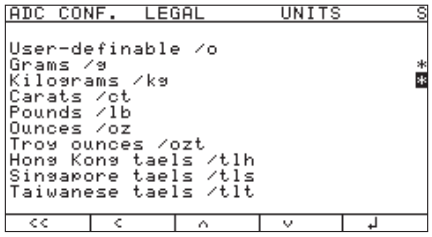
▶ Enter the verification scale interval for Range 1 in the "E" input field.
The minimum capacity for a class (III) scale must be set to 0.02 kg.
▶ Use the "<" soft key to go to the next menu level.
▷ The active range configuration is marked with "o."



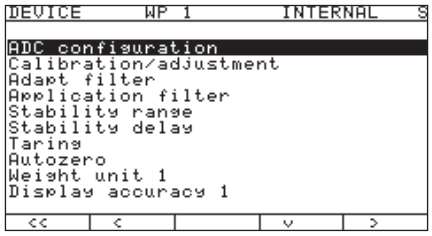
▶ Use the "<" soft key to go back to the "VeriVable" menu.

Selecting Units

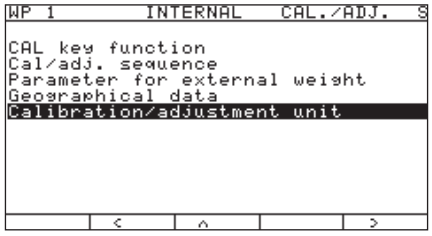
▶ Use the "v" and ">" soft key to open the "Available units" menu item.
This menu lets you enable or disable the weight units available under "Weight unit 1," "Weight unit 2" and "Weight unit 3."



▶ Select the respective unit using the "^" or "v" soft key and confirm using the "↵" soft key.
In most cases, you will not need to change defined values.
Available weight units are marked by a *.
The weight unit used for configuration of weighing ranges cannot be blocked.

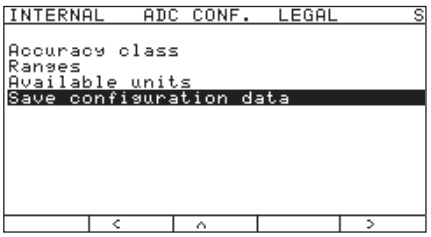


▶ Use the "<" soft key to go back to the "Internal" menu.

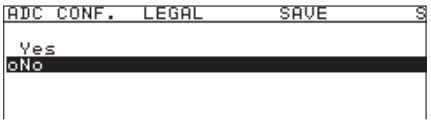


▶ Use the "v" and ">" soft key to open the "Calibration/ adjustment" menu.
▶ Use the "v" and ">" soft key to open the "Calibration/ adjustment unit" menu item to define the weight unit for calibration and adjustment. In most cases, you will not need to change defined values.
▷ All units are displayed in the menu that are activated in "Available units." The current setting is marked by a "o."

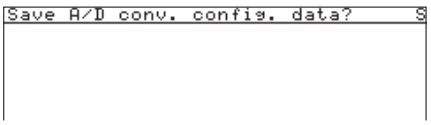
- ▶ To change the calibration/adjustment unit, select the unit using the "^" or "v" soft key and confirm using the "↵" soft key.
- ▶ Use the "<" soft key to go back to the "Internal" menu.
- ▶ Use the "^" soft key to select the "ADC conVguration" menu item.



- ▶ Use the ">" and "v" soft key to select the "Save conVguration data" menu item.

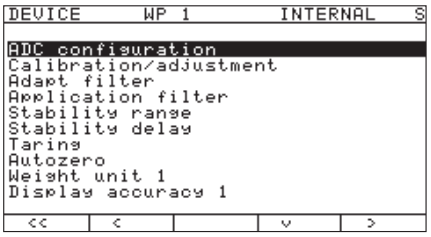


- ▶ To save the configuration, use the "^" soft key to select "Yes" and confirm using the "↵" soft key.
- ▷ The message "Function activated" appears briefly.
  The program then returns automatically to the regular weighing mode.



To not save the configuration:

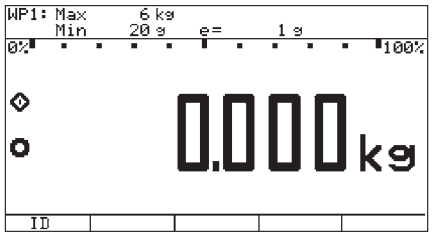
- ▶ Press the "<" soft key to exit the menu.
- ▷ The program returns to the next higher menu level.



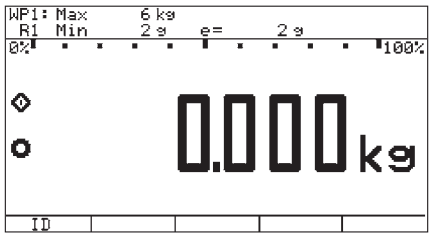
To not save data:

- ▶ Press the "o" soft key. The program returns to the WP1:Internal.
- ▶ Slide the menu access switch to the right (= "closed" position) and reattach the cap.
- ▷ The device is now in normal weighing mode.

Once ADC configuration has been completed, an adjustment of the weighing platform (calibration/adjustment and linearization) must be carried out (see "Calibration/Adjustment without Weights" and "External Linearization").



The displays depicted in the next two illustrations on the left show data from a multi-interval scale configured as described above, or a similarly configured multiple-range scale.



If the A/D converter was configured with a “Verifiable” data record, the lines for display of metrological data (lines 1 and 2) show the data valid for use in legal metrology.

The current range (e.g. **R 1**) is displayed top left under the weighing point for multiple-range scales.

ADC Configuration with Load Cell(s) Connected

Procedure:

1. Open the menu access switch, see “Analog/Digital Converter (ADC) Configuration.“
2. Activate the Service mode, see “Service Mode.“
3. Configure WP 1, see “Analog/Digital Converter (ADC) Configuration.“
4. Set single-range mode, for example, see “Analog/Digital Converter (ADC) Configuration.“
5. Select the units, see “Analog/Digital Converter (ADC) Configuration.“
6. Adjust without weights, see “Adjust without weights.“
7. Set/Delete the preload, see “Setting the Preload“ and “Deleting the Preload.“

Entering Geographical Data for Use in Legal Metrology

Purpose

Entering geographical data allows the external adjustment of weighing equipment at a place (e.g. at the manufacturer or vendor's place of business) that is not the same as the place of installation. If the weighing equipment is adjusted at the place of installation, it is not necessary to enter geographical data.
The sensitivity of weighing equipment changes depending on the place of installation as it is dependent on the on-site gravitational force – or, more precisely, on gravitational acceleration. Saving geographical data makes it possible to change the place of installation of the weighing equipment after external adjustment has been carried out.
The adjustment of weighing equipment is valid at the place of installation and within a specific tolerance zone. At 3000 e this zone extends ±100 km from the set geographical latitude and ±200 m from the set elevation above sea level.

Installation Location in Germany

An exception to this is the setting for "Germany (Zone D):" If during external adjustment of weighing equipment within Germany the geographical data

- Geographical latitude: 51.00 degrees
- 513 m elevation above sea level

are entered, the weighing equipment can be used throughout Germany.
Gravitational acceleration for "Germany (Zone D)" is 9.810 m/s². On delivery the geographical data for "Germany (Zone D)" are entered in the output device.

It is recommended to use the geographical data settings for "Germany (Zone D)" when adjusting and delivering the weighing equipment within Germany.

Entering exact geographical data will lead to a higher level of accuracy but will also restrict the tolerance zone.

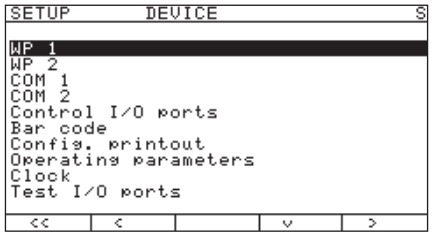
Setup Information

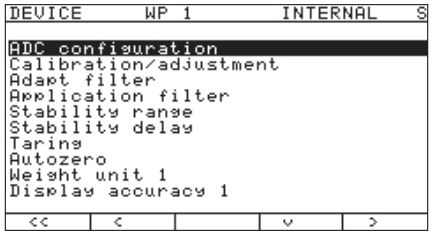
- It is only possible to enter geographical data when the menu access switch is open.
- When the Service mode is active, geographical data can be entered in the Setup menu under "WP 1" for the first weighing platform and "WP 2" for the second. Settings are made in the "Calibration/adjustment: Geographical data: Input parameters" menu.
- You can enter either the "latitude" (geographical latitude in degrees) and "altitude" (elevation in m above sea level) or the value for gravitational acceleration "gravity."
  Gravitational acceleration takes precedence over the geographical latitude and elevation of the location: If it has been entered, input fields for latitude and elevation show the values "99999.99" and "9999999" respectively. If only elevation and latitude have been entered, "0000000" is displayed for gravitational acceleration.

Then make sure that the geographical data for the adjustment location has been entered correctly. If no external adjustment is carried out, enter the data for the installation location. The data can be obtained from the relevant land registry or Ordnance Survey.

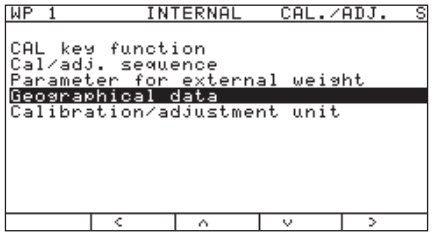
Procedure

- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= "open" position).
  If the device is part of a verified weighing facility, this will only be possible if the verification seal is broken. The weighing equipment must then be verified again.
- ▶ Activate the Service mode, see "Service Mode."
- ▶ Select weighing platform "WP 1" in the "Device Parameters" menu item.
- ▶ If the "Internal" setting is not already activated (marked by "o"), select the setting using the "^" or "v" soft key and confirm with ">."





- ▷ The menu for the "WP-1 INTERNAL" device parameters is displayed.
- ▶ Use the "^" or "v" soft key to select and open the "Calibration/adjustment" menu using ">."



- ▶ Use the "^" or "v" soft key to select and use ">" to open the "Geographical data" menu.

- ▶ Use the ">" soft key to confirm "Input parameters."

Entering Geographical Latitude and Elevation

- ▶ Use the "^" or "v" soft key to select the corresponding input field.
- ▶ Enter the number via the keypad and confirm using the "↵" soft key.
- ▷ The next input field is selected.

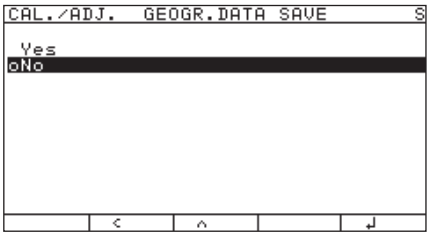
In this example, the geographical data are entered for the respective platform as a value pair "Latitude" and "Altitude." After this data was saved and the scale returned to weighing mode, this pair of values is displayed again the next time the display menu is opened. The input field for gravitational acceleration is empty.

In this example, the value for gravitational acceleration is entered for the place of installation. The fields "Latitude" and "Altitude" are invalid. The set value is then re-displayed after it is saved and the input menu is re-opened. If you exit the Setup menu and then open the Service mode, the set value for gravity is no longer displayed.

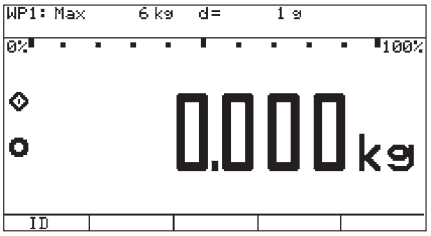
Entering Gravity

- ▶ Use the "^" or "v" soft key to select the corresponding input field.
- ▶ Enter gravity in m/s² via the keypad and confirm using the "↵" soft key.
  Permissible value range:
  9.700000 d < gravity 2 d < 9.900000
  In the example shown here, the value for gravity has been changed.
  The new value, 9.810000 m/s2 applies to the setting "Germany (Zone D)."
- ▶ Press the "<" soft key to exit the Input menu.

- ▶ Use the "^" soft key to select the "Save parameters" menu item.



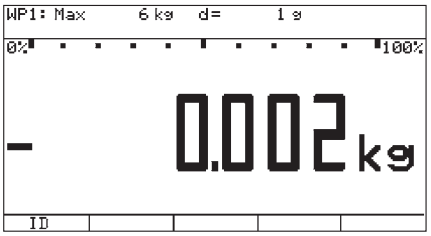
- ▶ Use the "^" soft key to select "Yes" and use the "↵" soft key to confirm.
- ▷ The message "Data stored" appears briefly.
  The program then returns to the "No" display status.
- ▶ Press SETUP or "<<" to exit the Setup menu.
- ▶ Slide the menu access switch to the right (= "closed" position) and reattach the cap.
- ▷ The display goes out and the device restarts. Then weighing mode is active.



Adjusting Scales in Operating Mode

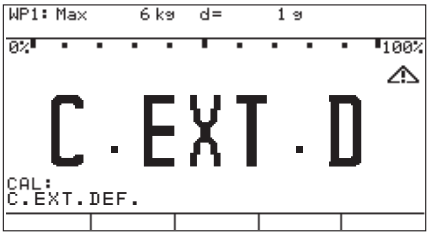
See also "Calibration and Adjustment" in the chapter called "Operation"

- ▶ Open the Device parameters menu for the respective weighing platform, (e.g. "WP 1: INTERNAL").
- – Open the "Calibration/adjustment" submenu.
- – „CAL key function" menu item:
  Setting "Ext. cal./adj.: factory-def. wt."
  (factory setting).
- – „Cal/adj. sequence" menu item:
  Setting "Cal. then manual adj." (factory setting).
- – „Activate ext. adj." menu item
  (not for a verifiable configuration):
  Setting "Activated" (factory setting).
  To display geographical data in the Device parameters menu, open the "Operating parameters" submenu.
  Menu item "Display geogr. data > On".



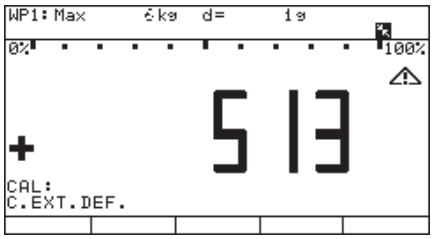
- ▶ Press →0← to unload the scale.

▶ Press [ISO-Test] to start an external adjustment.

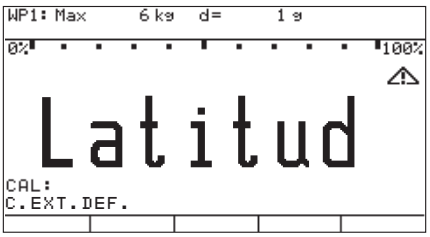


▷ The display "C.EXT.D" appears briefly.
In the example, the altitude and latitude of the installation location are being entered.

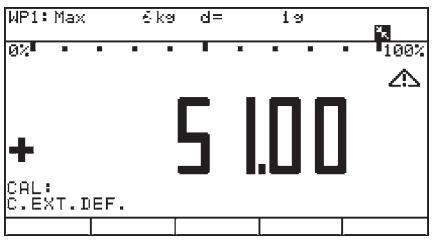
▷ The display "Altitud" appears briefly.



▷ The altitude at the place of installation is displayed in meters above sea level - here, the altitude for "Germany (Zone D)."
▶ Press [ISO-Test] to confirm the displayed value or press [→0←] to cancel the adjustment.

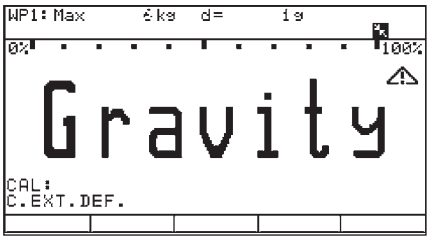


▷ The display "Latitud" appears briefly.

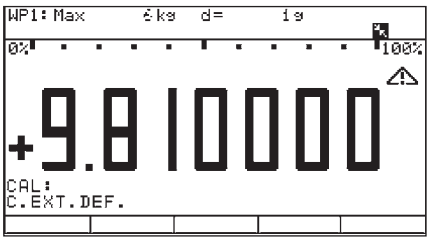


▷ The geographical latitude of the place of installation is shown in degrees north or degrees south - here the latitude setting for "Germany (Zone D)."
▶ Press [ISO-Test] to confirm the displayed value or press [→0←] to cancel the adjustment.

▷ You are prompted to place the required weight on the platform (e.g.: 5.0 kg).
The subsequent steps for completing the calibration/adjustment are described in the chapter entitled "Operation" under "Calibration and Adjustment."



If gravity is being entered instead of altitude and latitude, then "Gravity" is displayed for a brief time after "CAL."

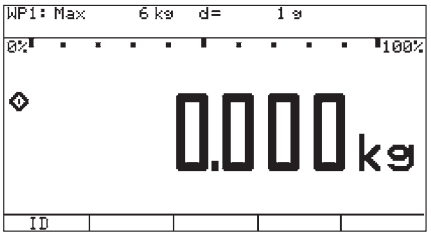


The entered value appears in m/s², here for the "Germany (Zone D)" setting.

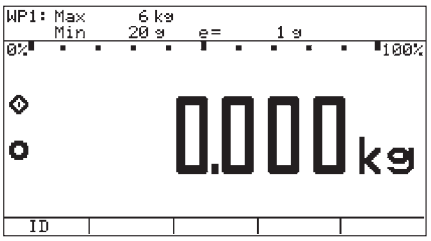
▶ Press ISO-Test to confirm the displayed value or press →0← to cancel the adjustment.

▷ You are prompted to place the required weight on the platform (e.g.: 5.0 kg). The subsequent steps for completing the calibration/adjustment are described in the chapter entitled "Operation" under "Calibration and Adjustment."

▶ Slide the menu access switch to the right (= "closed" position) and reattach the cap.



▷ The display goes out and the device restarts. Then weighing mode is active.



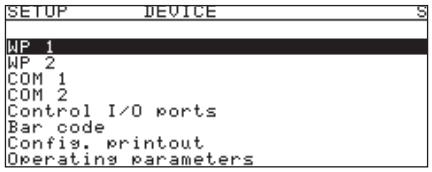
If adjustment is carried out using a verifiable configuration data record, the lines for display of metrological data (lines 1 and 2) show the data valid for use in legal metrology, if the menu access switch is closed. See also the chapter "Operation", "Configuration for Use in Legal Metrology."

Entering Adjustment and Linearization Weights

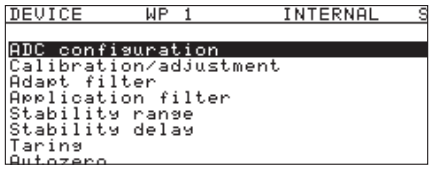
Purpose Entering adjustment and linearization weights.

Procedure See also “Calibration and Adjustment“ in the chapter called “Operation“.

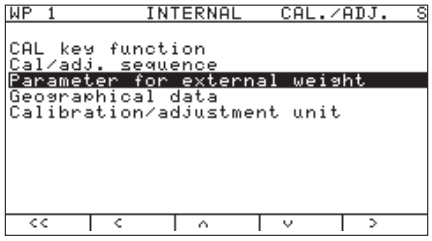
- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= “open“ position).
- ▶ Activate the Service mode, see “Service Mode.“
- ▶ Select weighing platform “WP 1“ in the “Device Parameters“ menu item.
- ▶ If the “Internal“ setting is not already activated (marked by “o“), select the setting using the “^“ or “v“ soft key and confirm with “>.“
- ▷ The menu for the “WP-1 INTERNAL“ device parameters is displayed.



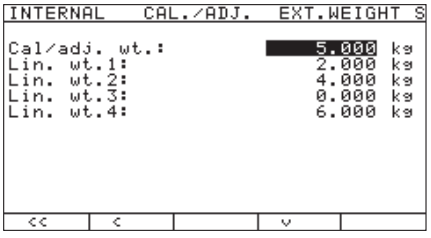
- ▶ Use the “^“ or “v“ soft key to select and open the “Calibration/adjustment“ menu using “>.“



- ▶ Use the “^“ or “v“ soft key to select and use “>“ to open the “Parameter for external weight“ menu.



- ▶ The first menu item “Cal/adj. wt.:“ (for selecting the user-defined calibration weight), is also accessible without activating the Service mode. The values for the linearization weights “Lin.-wt. 1“ to “Lin.-wt. 4“ can, however, only be changed in the Service mode.
- ▷ The current values for the user-defined calibration weight and the 4 linearization weights are displayed. In this example, the value for the external, user-defined adjustment weight is changed to 6.000 kg.
- ▶ Press [6] [·] [0] [0] [0] and confirm with the “↵“ soft key.
- ▷ The “Lin.-wt. 1“ input field is selected. In this example, the value for linearization weight 1 is changed to 1.500 kg.
- ▶ Press [1] [·] [5] [0] [0] and confirm with the “↵“ soft key.
- ▷ The “Lin.-wt. 2“ input field is selected.



- ▶ Enter or change all linearization weights in sequence as needed. If you do not require all linearization positions, enter “0.000“ in the unused fields to hide these lines in the display. Confirm with the “↵“ soft key after each entry to move to the next input field.

In the example shown here, four linearization weights have been entered (1.5 kg, 3.0 kg, 4.5 kg and 6.0 kg).
When you close the input menu by pressing the “<“ soft key, the input values are directly applied.

- ▶ Slide the menu access switch to the right (= “closed“ position) and reattach the cap.

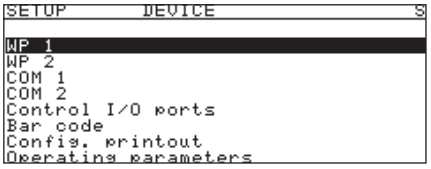
Function Allocation of the allocation for the [ISO-Test] Key for Calibration/Adjustment

Purpose

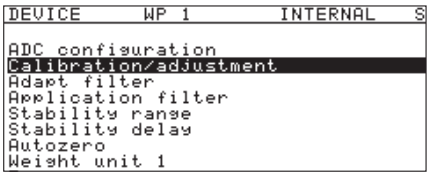
The [ISO-Test] key is used for the calibration/adjustment function. Key settings can be changed when the Service mode is activated:

Procedure

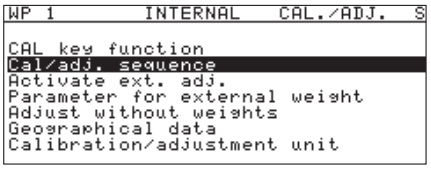
- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= "open" position).
- ▶ Activate the Service mode, see "Service Mode."



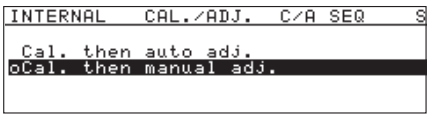
- ▶ Select weighing platform "WP 1" in the "Device Parameters" menu item.
- ▶ If the "Internal" setting is not already activated (marked by "o"), select the setting using the "^" or "v" soft key and confirm with ">."
- ▷ The menu for the "WP-1 INTERNAL" device parameters is displayed.



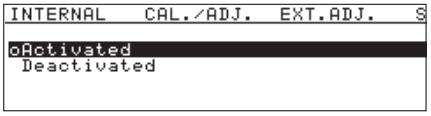
- ▶ Use the "^" or "v" soft key to select and open the "Calibration/ adjustment" menu using ">."



- ▶ Use the ">" soft key to open the "Cal/adj. sequence" menu.

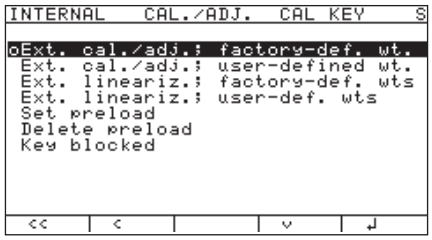


- ▶ Use the "^" or "v" soft key to select the "Cal. then manual adj." menu (factory setting) and confirm with the "↵" soft key.
- ▶ Use the "<" soft key to go to the next menu level.



- ▶ Use the ">" soft key to open the "Activate ext. adj." menu.
- ▶ Use the "^" or "v" soft key to select the "Activated" menu item (factory setting). Not for a verifiable configuration.
- ▶ Geographical data is not displayed during calibration/adjustment (factory setting).

To display geographical data in the Device parameters menu, open the "Operating parameters" submenu.
Menu item "Display geogr. data > On".

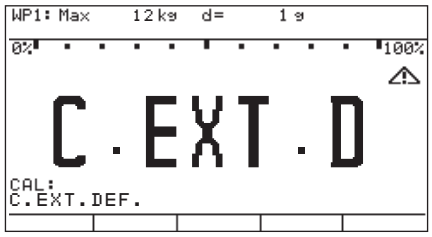


- ▶ Use the "**>**" soft key to open the "**CAL key function**" menu.
- ▷ The "**CAL key function**" submenu is displayed.
- ▶ Use the "**^**" or "**v**" soft key to select the corresponding menu item and confirm with "**↵**."
- ▷ The menu item is marked by a circle "**o**."

Note
The functions that can be configured in the "**CAL key function**" submenu depends on the selected weighing platform and its configuration data. Functions that cannot be accessed are not displayed in the selection screen.

Important Note!
The function set in the "**CAL key function**" menu is carried out in the normal weighing mode because when you exit the Setup menu the Service mode is deactivated. To perform the function on a digital weighing platform (such as an IS platform), however, it must be carried out in Service mode.

- ▶ The procedure is as follows: after selecting the desired function and exiting the Setup menu, reactivate Service mode again and then exit the Setup menu immediately by pressing the SETUP key or the "**<<**" soft key.
- ▷ The scale is now in Service mode without this being displayed.
- ▶ Trigger the previously set function using the ISO-Test key.
- ▷ The display shows "**S_CAL:**" indicating that the scale is in Service mode.
- ▶ The corresponding menu item can be selected using the "**Select**" soft key and carried out using the ISO-Test key.
- ▶ If you cancel the function using the →0← key or by restarting the scale using the I/⏻ key, you will exit the Service mode.



External Calibration/Adjustment with Factory-Defined Weight (Default Weight)

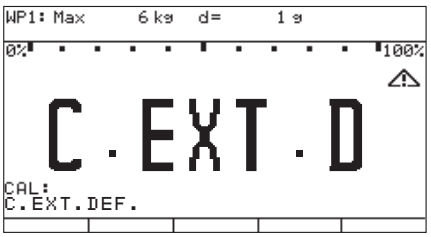
Configuration

If not already selected (factory setting, marked by "**o**" when active), select the "**CAL key function:Ext. cal./adj.: factory-def. wt.**" menu item (external adjustment with a factory-defined, standard weight).

- ▶ Use the "**^**" or "**v**" soft key to select this menu item and confirm with "**↵**."
- ▷ The menu item is marked by a circle "**o**."

Note:
The menu items "**Ext. cal./adj.: factory-def. wt.**" (external adjustment with a factory-defined, standard weight), "**Ext. cal./adj.: user-deVned wt.**" (external adjustment with a user-defined weight) and "**Key blocked**" can also be accessed without activating the Service mode.

- ▶ Press I/⏻ to turn off the device.
- ▶ Press I/⏻ turn the device back on.
- ▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.
- ▶ Press →0← to unload and zero the scale.
- ▶ Press ISO-Test to start the external adjustment.



▷ The display "C.EXT.D" appears briefly.

Note

If the display of geographical data (elevation and latitude or gravity) is activated, this data is displayed and confirmed each with a press of the ISO-Test key (you can cancel the calibration / adjustment process using the →0← key).
See also "Entering Geographical Data for Use in Legal Metrology" in this chapter.

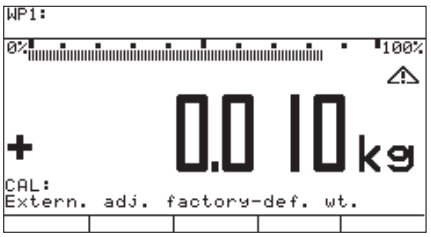
Procedure

▷ The target value of the required adjustment weight (5.000 kg in the example) is displayed as a negative value.

▶ Place the required adjustment weight on the platform.

Note

If the calibration/adjustment sequence is set to automatic ("Calibration/adjustment:Cal./adj. sequence:Cal., then auto adjust" menu, see "Function Allocation of the allocation of the ISO-Test Key for Calibration/Adjustment") and the adjustment weight consists of several pieces, then they should be placed on the platform in series at short intervals.
When the weighing instrument has stabilized, the weight on the scale is accepted as the calibration weight after a predefined interval, and the weighing instrument is calibrated/adjusted with this weight.
The difference since the most recent span adjustment is not displayed; this value is output only on GMP-compliant printouts.

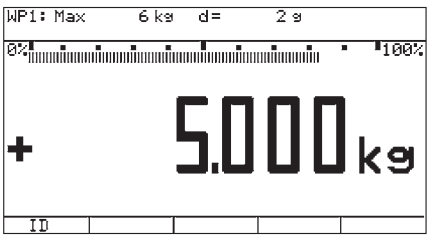


▷ After a brief pause, the difference since the last span adjustment is displayed (calibration).

Note

This display only appears for the "Cal. then manual adj." setting (see previous note). If "Cal. then auto adj." is active, the calibration/adjustment procedure cannot be cancelled.
To stop the procedure after calibration and before adjustment takes place, press the →0← key (only if "Cal. then manual adj." is active).

▶ Press ISO-Test to adjust the scale (only if "Cal. then manual adj." is active).



▷ At the conclusion of the calibration procedure, the calibration weight is displayed as a positive value.

```
--------------------
14.01.2010     13:50
Type  CAW3P1-6DC-LCE
Ser.no.      12345678
Vers.no. 1.02.101110
BVers.       01-63-02
--------------------
External calibration
Nom.  +     5.000 kg
Diff. +     0.010 kg
External  adjustment
Diff. +     0.000 kg
--------------------
14.01.2010     13:52
Name:
```

When calibration/adjustment is complete, the GMP-compliant printout shown on the left is generated. If the adjustment procedure is canceled (only calibration is performed), the last two lines, “External calibration” and “Diff. + 0.000 kg” are not printed.

- ▶ Unload the scale.
- ▶ Press [I/⏻] to turn off the device.
- ▶ Press [I/⏻] turn the device back on.
- ▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.

⚠ If a serious operator error should occur during calibration (for example, if the menu setting “**Cal. then auto adj.**“ is active and the wrong calibration weight is placed on the scale), the scale might completely fail to stabilize, which means it cannot show a zero point.
In this case, select the “**Adjust without weights**“ menu and set the mean sensitivity of the strain-gauge weighing beam to 2.0 mV/V.
Then re-adjust the scale.
See also “Adjust without weights.“

The zero point is only displayed for a verified scale with d=e.

External Calibration/Adjustment with a User-Defined Weight

Configuration

Select the “**CAL key function:Ext. cal./adj.: user-def. wt.**“ menu item (external adjustment using a user-defined weight).

```
INTERNAL   CAL./ADJ.  CAL KEY    S

 Ext. cal./adj.: factory-def. wt.
oExt. cal./adj.: user-defined wt.
 Ext. lineariz.: factory-def. wts
 Ext. lineariz.: user-def. wts
 Set preload
 Delete preload
 Key blocked

 <<  |  <  |  ^  |  v  |  ↵
```

Note:
The menu items “**Ext. cal./adj.: factory-def. wt.**“ (external adjustment with a factory-defined, standard weight), “**Ext. cal./adj.: user-deVned wt.**“ (external adjustment with a user-defined weight) and “**Key blocked**“ can also be accessed without activating the Service mode.

- ▶ Use the “^“ or “v“ soft key to select this menu item and confirm with “↵.“
- ▷ The menu item is marked as set by a circle “o.“

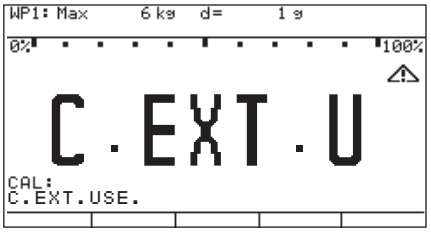
```
INTERNAL   CAL./ADJ.  EXT.WEIGHT

Cal/adj. wt.:          6.000 kg

 <<  |  <  |     |     |
```

- ▶ Enter the target value of the adjustment weight in the “**Calibration/adjustment**“ menu under “**Parameter for external weight**“ in the “**Cal/adj. wt**“ input field.

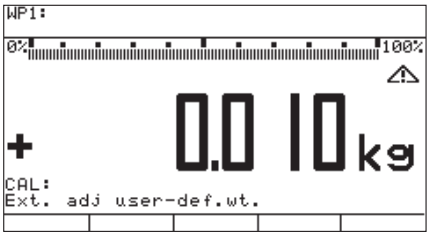
▶ Press [I/⏻] to turn off the device.
▶ Press [I/⏻] turn the device back on.
▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.
▶ Press [→0←] to unload and zero the scale.
▶ Press [ISO-Test] to start the external adjustment.
▷ The display "C.EXT.U" appears briefly.



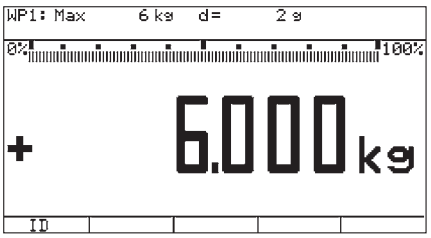
Note
If the display of geographical data (elevation and latitude or gravity) is activated, this data is displayed and confirmed each with a press of the [ISO-Test] key (you can cancel the calibration/adjustment process using the [→0←] key). See also "Entering Geographical Data for Use in Legal Metrology" in this chapter.

Procedure

▶ Press [ISO-Test] to confirm the displayed value or press [→0←] to cancel the adjustment.
▷ The target value of the required adjustment weight (6.000 kg in the example) is displayed as a negative value.
▶ Place the required adjustment weight on the platform.
If the calibration/adjustment sequence is set to "Cal. then auto adjust", refer to the note under "External Calibration/Adjustment with Factory-Defined Weight (Default Weight)."



▷ After a brief pause, the difference since the last span adjustment is displayed (calibration).
▶ If you only want to perform a calibration, press the [→0←] key to cancel the calibration/adjustment procedure.
▶ Press [ISO-Test] to adjust the scale.



▷ At the conclusion of the calibration procedure, the calibration weight is displayed as a positive value.

```
--------------------
14.01.2010     13:50
Type  CAW3P1-6DC-LCE
Ser.no.     12345678
Vers.no. 1.02.101110
BVers.      01-63-02
--------------------
External calibration
Nom.  +    6.000 kg
Diff. +    0.010 kg
External  adjustment
Diff. +    0.000 kg
--------------------
14.01.2010     13:52
Name:
```

When calibration/adjustment is complete, the GMP-compliant printout shown on the left is generated. If the adjustment procedure is canceled (only calibration is performed), the last two lines, "External calibration" and "Diff. + 0.000 kg" are not printed.

▶ Unload the scale.
▶ Press [I/⏻] to turn off the device.
▶ Press [I/⏻] turn the device back on.
▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.

If a serious operator error should occur during calibration (for example, if the menu setting "Cal. then auto adj." is active and the wrong calibration weight is placed on the scale), the scale might completely fail to stabilize, which means it cannot show a zero point.
In this case, select the "Adjust without weights" menu and set the mean sensitivity of the strain-gauge weighing beam to 2.0 mV/V.
Then re-adjust the scale.
See also "Adjust without weights."

Internal Calibration/Adjustment

This function is available only if a digital weighing platform (for example, an IS platform) is connected to WP 1, either as a second weighing platform or as the only weighing platform without using the built-in A/D converter WP 1. The connection can be made both via the COM1, COM2 or UNICOM interface with a corresponding configuration as well as via the expansion PCBs for WP 1 or WP 2.

This function is also accessible without activating the Service mode.

Adjustment Without Weights

Purpose

In the Service menu, adjustment without weights can be carried out by entering the characteristic data of the load cells.

Adjustment without weights may not be carried out on weighing equipment used in legal metrology.

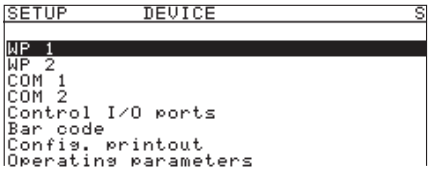
Setup information

- Adjustment without weights is only possible when the menu access switch is open in the Service mode.
- The "Nominal load" parameter must be entered in the "kg" unit.
- The "Resolution" parameter must be entered in the "kg" unit and must correspond to the scale interval "d" entered for the ADC configuration.
- The "Sensitivity" parameter is entered in "mV/V" (see the data sheet for the value).

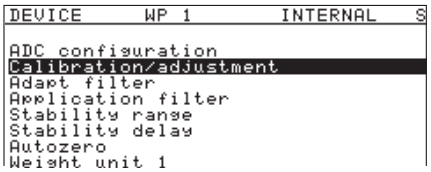
These values are converted to internal quantities.
Once the ADC configuration data have been stored (by selecting the "Save parameters" menu item), these parameters can no longer be read.

Procedure

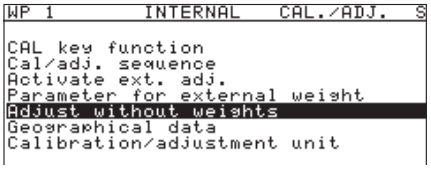
- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= “open“ position).
- ▶ Activate the Service mode, see “Service Mode.“



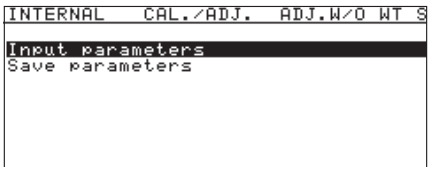
- ▶ Select weighing platform “WP 1“ in the “Device Parameters“ menu item.
- ▶ If the “Internal“ setting is not already activated (marked by “o“), select the setting using the “^“ or “v“ soft key and confirm with “>.“



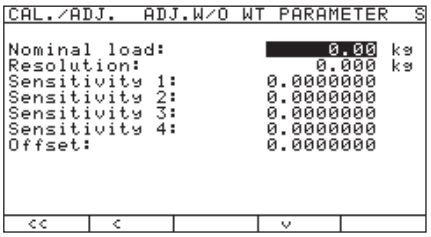
- ▷ The menu for the “WP-1 INTERNAL“ device parameters is displayed.
- ▶ Use the “^“ or “v“ soft key to select and open the “Calibration/ adjustment“ menu using “>.“



- ▶ Use the “^“ or “v“ soft key to select and use “>“ to open the “Adjust without weights“ menu.



- ▶ Use the “>“ soft key to open the “Input parameters“ menu.



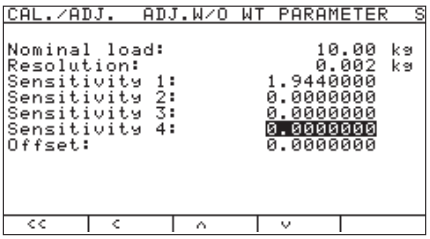
- ▷ The Input menu is displayed.
  Enter the nominal capacity and resolution of the load cells in kg and the sensitivity of the load cells in mV/V in the corresponding input fields.
  The maximum capacity is usually less than the value to be entered in the “Adjust without weights“ menu for the nominal capacity of the load cell, as load cells carry additional weight (e.g., a weighing platform).

If the weighing platform has multiple load cells, multiply the nominal capacity accordingly.

Example:
The weighing platform has 4 load cells each at 50 kg.
The nominal capacity is 4 x 50 kg = 200 kg.
In the example shown here, the weighing platform consists of one load cell with a maximum capacity of 10 kg.

▶ Press [1] [0] [·] [0] [0] and confirm with the "↵" soft key.
▷ The "Resolution" input field is selected.
The smallest digit "d" is entered in this field in "kg". The value must correspond to the "D" entry in "ADC conVguration: Standard: Ranges: Single-range mode."
In the example, this should be d = 0.002 kg.

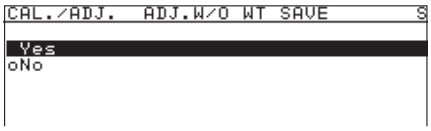
▶ Press [0] [·] [0] [0] [2] and confirm with the "↵" soft key.
▷ The "Sensitivity 1" input field is selected.
If the weighing platform has multiple load cells, enter the sensitivity either
– under "Sensitivity 1" ... "Sensitivity 4" as an individual value or
– under "Sensitivity 1" as an average value.
If an average value is entered for all cells, or if fewer than 4 load cells are present, enter "0" in the remaining fields. Range of permitted values: 0.01...5 mV/V.



▶ Press [1] [·] [9] [4] [4], e.g. to enter a sensitivity of 1.944 mV/V.
▶ Confirm using the "↵" soft key.
▷ The "Sensitivity 2" input field is selected.
▶ Either enter a value or set all remaining input fields to "0."
▶ Confirm each using the "↵" soft key.

▶ Press the "<" soft key to exit the menu.

▶ Use the "v" soft key to select the "Save parameters" submenu.



▶ To save the configuration, select "Yes" and confirm using the ↵ soft key.
In the first line of the display, the message "Data stored" is shown briefly.
Then the program then returns to the "No" display status.
▶ Use the "<" to return to the next menu level.
▶ Press [SETUP] or "<<" to exit the Setup menu.
▶ Slide the menu access switch to the right (= "closed" position) and reattach the cap.
▷ The display goes out and the device restarts. Then weighing mode is active.

Function Allocation of the [ISO-Test] Key for Linearization and Setting/ Deleting the Preload

Purpose

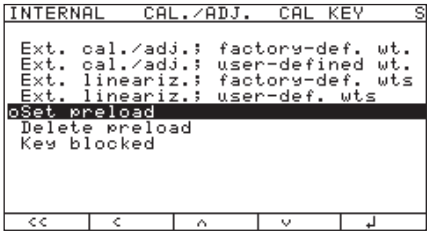
The [ISO-Test] key is normally used for the calibration/adjustment function.
The following additional functions can be allocated to the key when the Service mode is activated:

- External linearization with default weights
- External linearization with entered linearization weights
- Internal linearization (for external IS platforms only)
- Set preload (not possible in Legal Metrology)
- Delete preload (not possible in Legal Metrology)

Once linearization has been completed, or after a preload has been set or deleted the function of the [ISO-Test] key must be reallocated back to its original function in the Setup menu, e.g. external calibration/adjustment with default weights.

Procedure

- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= "open" position).
- ▶ Activate the Service mode, see "Service Mode."
- ▶ Select weighing platform "`WP 1`" in the "`Device Parameters`" menu item.
- ▶ If the "`Internal`" setting is not already activated (marked by "`o`"), select the setting using the "`^`" or "`v`" soft key and confirm with "`>`."
- ▷ The menu for the "`WP-1 INTERNAL`" device parameters is displayed.
- ▶ Use the "`^`" or "`v`" soft key to select and open the "`Calibration/ adjustment`" menu using "`>`."
- ▷ The "`CAL key function`" submenu is displayed.
- ▶ Use the "`^`" or "`v`" soft key to select the corresponding menu item and confirm with "`↵`."
- ▷ The menu item is marked by a circle "`o`."



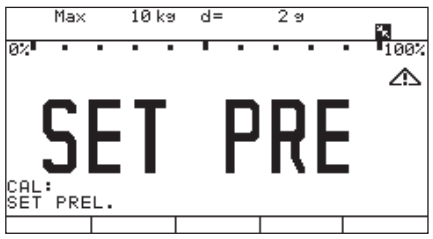
Note

The functions that can be configured in the "`CAL key function`" submenu depends on the selected weighing platform and its configuration data. Functions that cannot be accessed are not displayed in the selection screen.

Note

The function set in the "`CAL key function`" menu is carried out in the normal weighing mode because when you exit the Setup menu the Service mode is deactivated. To perform the function on a digital weighing platform (such as an IS platform), however, it must be carried out in Service mode.

- ▶ The procedure is as follows: after selecting the desired function and exiting the Setup menu, reactivate Service mode again and then exit the Setup menu immediately by pressing the [SETUP] key or the "`<<`" soft key.
- ▷ The scale is now in Service mode without this being displayed.
- ▶ Trigger the previously set function using the [ISO-Test] key.
- ▷ The display shows "`S_CAL:`" indicating that the scale is in Service mode.
- ▶ The corresponding menu item can be selected using the "`Select`" soft key and carried out using the [ISO-Test] key.
- ▶ If you cancel the function using the [→0←] key or by restarting the scale using the [I/⏻] key, you will exit the Service mode.



External Linearization with the Factory-Defined Weight (Default Weights)

Setup Information

- This function is accessible only if the software and the functionality of the connected weighing platform permit this operation.
- External linearization when weighing in legal metrology is only possible when the menu access switch is open.
- The [ISO-Test] key must be assigned the “External linearization“ function, see “Function Allocation of the [ISO-Test] Key for Linearization and Setting/Deleting the Preload.“
- Activating the display of geographical data has no effect on this function.

Once linearization has been completed, the [ISO-Test] key must be reallocated back to its original function in the Setup menu, e.g. external calibration/adjustment with default weights.

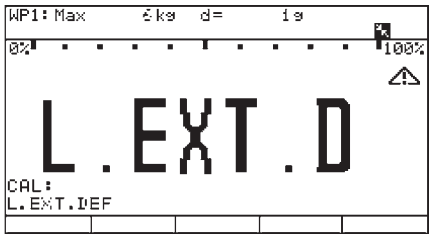
Procedure

▶ For scales used in legal metrology, slide the menu access switch to the left (= “open“ position).

▷ The display goes out and the device restarts. Then weighing mode is active.

▶ Press [→0←] to unload and zero the scale.

▶ Press [ISO-Test] to start the external linearization.



▷ The display “L.EXT.D“ appears briefly.
Additional steps are explained in “External Linearization with User-Defined Weights.“

External Linearization with User-Defined Weights

Setup Information

- This function is accessible only if the software and the functionality of the connected weighing platform permit this operation.
- External linearization when weighing in legal metrology is only possible when the menu access switch is open.
- The [ISO-Test] key must be assigned the "External linearization" function, see "Function Allocation of the [ISO-Test] Key for Linearization and Setting/Deleting the Preload."
- Activating the display of geographical data has no effect on this function.

Once linearization has been completed, the [ISO-Test] key must be reallocated back to its original function in the Setup menu, e.g. external calibration/adjustment with default weights.

Configuration

▶ Set the linearization weights, see "Entering Adjustment and Linearization Weights."

Procedure

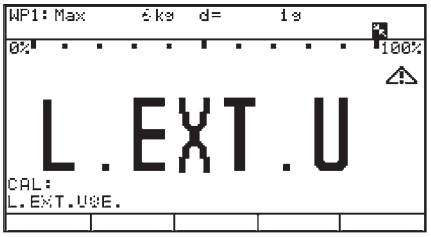
▶ For scales used in legal metrology, slide the menu access switch to the left (= "open" position).

▷ The display goes out and the device restarts. Then weighing mode is active.

▶ Press [→0←] to unload and zero the scale.

▶ Press [ISO-Test] to start the external linearization.

▷ The display "L.EXT.U" appears briefly.



▷ After approx. 2 seconds, the target value for linearization weight 1 is shown as a negative value on the display (in example shown here, 1.500 kg) .

▶ Place the required linearization weight 1 on the platform.

▶ Press [ISO-Test] to apply linearization weight 1 or press [→0←] to cancel the linearization function.

▷ After a short time the difference between the measured value and the true weight of the sample will be displayed.

```
--------------------
14.01.2010      13:00
Type   CAW3P1-6DC-LCE
Ser.no.       12345678
Vers.no. 1.02.101110
BVers.        01-63-02
--------------------
Linearization
Wt.1   +      1.500 kg
Wt.2   +      3.000 kg
Wt.3   +      4.000 kg
Wt.4   +      6.000 kg
          completed
--------------------
14.01.2010      13:02
Name:
```

- ▶ Press [ISO-Test] to apply linearization weight 1 or press [→0←] to cancel the linearization function.
- ▷ After the linearization weight 1 has been saved you will be prompted to place the second linearization weight on the weighing pan.
- ▶ Repeat the procedure for all required linearization weights.
- ▷ After the last linearization weight has been saved you will be prompted to remove any load from the weighing pan.
- ▶ Remove all linearization weights from the weighing platform.
- ▷ The zero point is applied automatically after a brief time. The indicator automatically switches to weighing operation.
  When linearization is complete, the GMP-compliant printout shown on the left is generated.
- ▶ Slide the menu access switch to the right (= “closed“ position).

Set preload

Setup Information

- Setting the preload when weighing in legal metrology is only possible when the menu access switch is open.
- The [ISO-Test] key must be assigned the “Set preload“ function, see “Function Allocation of the [ISO-Test] Key for Linearization and Setting/Deleting the Preload.“
- Activating the display of geographical data has no effect on this function.

Once the preload has been set, the [ISO-Test] key must be reallocated back to its original function in the Setup menu, e.g. external calibration/adjustment with default weights.

Procedure

▶ For scales used in legal metrology, slide the menu access switch to the left (= “open“ position).

▶ Press [I/⏻] turn the device back on.

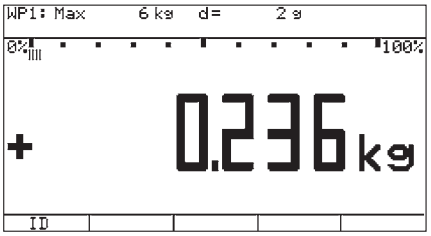
▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.

▶ Press [→0←] to unload and zero the scale.

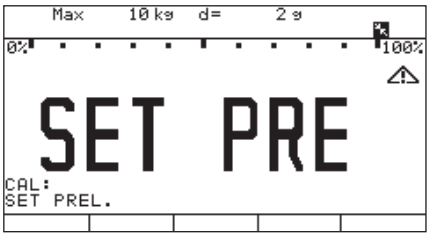
▷ Display after the scale has been zeroed.

▶ Place the preload weight on the weighing platform.

▶ Press [ISO-Test] to start “Set preload.“



▷ The display “SET PREL“ appears briefly.
After a short period of time the preload will be applied and the indicator will automatically switch back to weighing mode.
After the “Set Preload” operation has been completed, the scale is zeroed.



When the “Set preload“ function is complete, the GMP-compliant printout shown on the left is generated.

```
--------------------
14.01.2010      13:50
Type   CAW3P1-6ED-LCE
Ser.no.      12345678
Vers.no. 1.02.101110
BVers.       01-63-02
--------------------
Set preload
           completed
--------------------
14.01.2010      13:52
Name:

--------------------
```

▶ Slide the menu access switch to the right (= “closed“ position).

Delete preload

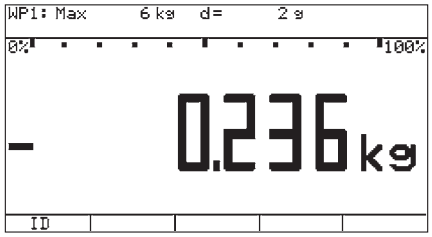
Setup Information

- Deleting the preload when weighing in legal metrology is only possible when the menu access switch is open.
- The [ISO-Test] key must be assigned the “Delete preload“ function, see “Function Allocation of the [ISO-Test] Key for Linearization and Setting/Deleting the Preload.“
- Activating the display of geographical data has no effect on this function.

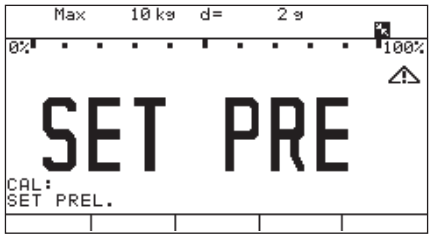
Once the preload has been deleted, the [ISO-Test] key must be reallocated back to its original function in the Setup menu, e.g. external calibration/adjustment with default weights.

Procedure

▶ For scales used in legal metrology, slide the menu access switch to the left (= “open“ position).
▶ Press [I/⏻] turn the device back on.
▷ The Sartorius logo is displayed briefly, after which the device is in normal weighing mode.
▶ Remove the preload weight from the weighing platform.
▷ The display shows the removed preload weight as a negative value.
▶ Press [ISO-Test] to start “Delete preload.“



▷ The display “CLR PREL“ appears briefly.
After a short period of time the preload will be deleted and the indicator will automatically switch back to weighing mode.



After the “Delete Preload” operation has been completed, the scale is zeroed.

When deleting the preload is complete, the GMP-compliant printout shown on the left is generated.

▶ Slide the menu access switch to the right (= “closed“ position).

```
--------------------
14.01.2010      13:50
Type   CAW3P1-6DC-LCE
Ser.no.      12345678
Vers.no. 1.02.101110
BVers.       01-63-02
--------------------
Delete preload
          completed
--------------------
14.01.2010      13:52
Name:

--------------------
```

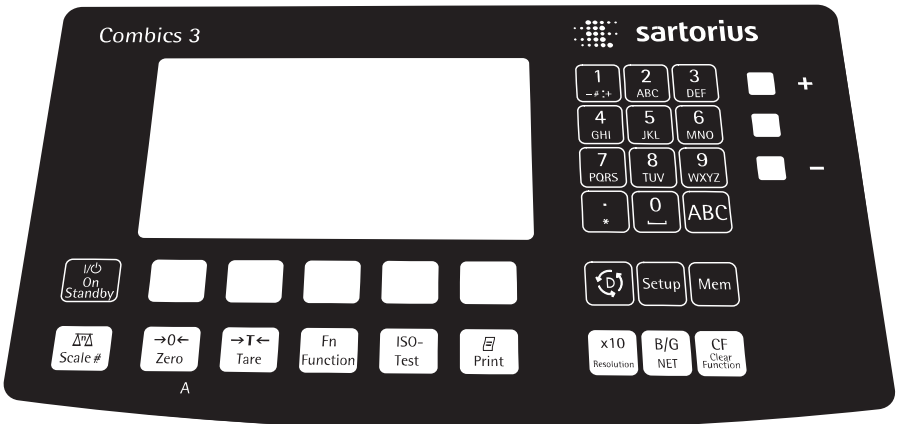
Operating Design

You can use the Combics 3 to record weight values from 1 to 3 weighing platforms, calculate and display weight values through application programs, and assign IDs to the samples weighed.

Configure the indicator first, using the Setup menu for the desired application program (printer settings, etc.). Then you can begin weighing.

When a key is pressed that does not have an active operating mode function, an acoustical signal (double beep) sounds and the message "----" is displayed for 2 seconds. The display then returns to the previous screen content.

Weighing Mode Operating Design



Labeled Keys

Some keys have a second function, activated by pressing and holding the key for over 2 seconds. Whether a function is available depends on the indicator operating state and operating menu settings.

I/⏻ On/Off key

▷ STANDBY is displayed in Standby mode.

⚖ If a second weighing platforms is connected, this key toggles the display between the two readouts.

→0← – Press briefly: Zero
- Press briefly: cancels calibration/adjustment
- Press longer than 2 seconds: displays the adjustment/configuration counter

→T← Tare the scale: press briefly.

Fn Displays the second weight unit or SQmin (depending on the settings, see "Operation," "SQmin Function").

ISO-Test Starts calibration or adjustment.

🖶 – For printing:
Press briefly.
- Prints GMP footer:
Press longer than 2 seconds.

x10 Toggles unit between normal and 10-fold higher resolution.

B/G Toggles the display between
gross value (net value plus tare) and
net value (gross value minus tare).

CF – Quits an application or deletes an input character:
Press the key less than 2 seconds.
- Deletes the entire input string:
Press the key longer than 2 seconds.

[D] Toggles to the Info mode:
Press longer than 2 seconds.

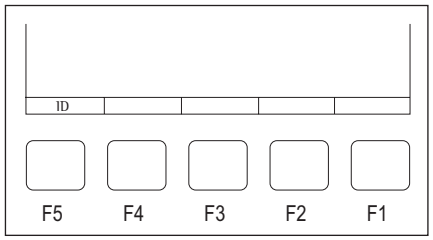
[Mem] Product data memory:
Saves initialization and user data (product and tare values).
The product data memory can store over 400 product and tare values.

[SETUP] Opens/Exits the Setup program

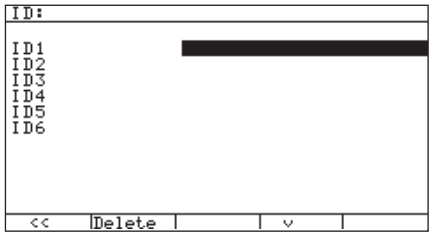
[1], [2], [3] ... [·], [0] Enters numbers, letters and other characters.

[ABC] Toggles between numeric and alphabetic input.

Soft keys



The functions of active soft keys are indicated by symbols and abbreviations in the last line on the display.
Abbreviation examples:
- ID: ID list
- DELETE: Delete entry



Symbols used for soft key functions:
- <<: Return to initial state
- <: Next higher menu level
- >: Show items under selected entry
- ^: Scroll up in the input/output window
- v: Scroll down in the input/output window
- ↵: Set the selected menu parameter

Numeric Input via the Keypad

▶ To enter numbers (one digit at a time):
Press [0], [1], [2] ... [9]
▶ To save input:
press the corresponding key.
For example, press [→T←] to save manual tare input.

Text Input via the Keypad

▶ Press the [ABC] key.
▷ "ABC" is displayed.
▶ For example, press the [4] key.
▷ The corresponding letter is displayed. The flashing cursor marks the first letter.
▶ Press the key as many times needed to select the desired letter.
▶ Press the F1 soft key (↵) or wait 2 seconds.
▷ The selected letter appears on the display.

Entering Spaces via the Keypad

▶ Press the ABC key.
▷ "ABC" is displayed.
▶ Press the 0 key.
▷ The corresponding selection is displayed. The flashing cursor marks the space.
▶ Press the F1 soft key (↵) or wait 2 seconds.
▷ The space appears on the display.

Special Character Input via the Keypad

▶ Press the ABC key.
▷ "ABC" is displayed.
▶ Press the 1 key.
▷ The corresponding character selection is displayed. The flashing cursor marks the first character.
▶ Press the F1 soft key (↵) or wait 2 seconds.
▷ The special character appears on the display.

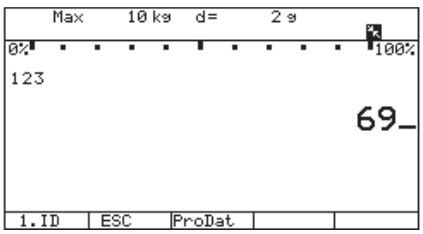
Deleting characters

▶ Press CF.

Deleting entire input string

▶ Press the F4 soft key (ESC).

Saving Input



▶ Enter a value.
▶ Press the corresponding soft key (e.g. 1.ID to define an identifier).

Saving Settings in Weighing Mode

You can specify the save type used in the Application Parameters Setup menu.
By default, all application parameters saved (e. g., reference values) remain in memory and are available when

- the device has been switched off and then on again
- you return to the originally selected application from a second one (e. g., when you switch from Averaging back to Counting all parameters saved for Counting are available).

Applying the Tare Weight

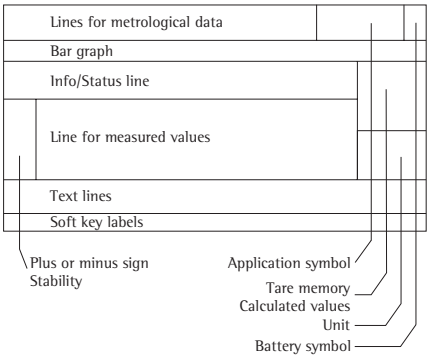
To save the weight on the weighing platform as a tare weight:

▶ Place the tare object on the weighing platform.
▶ Press →T←.
▷ The value is applied as the tare value.

Input Through the Digital Control Port

You can connect a remote hand switch or foot switch to the input control line, for use with all application programs. The following functions can be assigned in the Setup menu Device Parameters:Control I/O Ports:Universal Switch Key:

- Off
- Print key
- Print key >2 sec
- Tare key
- ISO test key
- Fn key function
- WP toggle key
- Combined zero/ tare function
- Zeroing key
- On key
- CF key
- F1 function key
- Appl. toggle key
- 10x higher resolution key
- Net/gross value key



Display in Weighing Mode

Weighing Mode: Display of Measured and Calculated Values

The display is divided into several sections.

Lines for metrological data — The following parameters are shown here:

Max	Maximum capacity (upper weighing range limit) of the active weighing platform
Min	Minimum capacity (lower weighing range limit) of the active weighing (verified models only)
e	Verification scale interval of the active weighing platform (verified models only)
d	Smallest display digit of the active weighing platform
R1 R2	Display of the current weighing range of the active weighing platform (with multiple range scale connected)

Symbols and Their Meaning

◇	The Busy symbol appears when the scale is processing a function activated by pressing a key.
+ −	The plus or minus sign of the weight or other measured value
o	Verified models only: Identifies “zero” as a weight value (after the scale or the active weighing platform has been zeroed)

Measured Value Line/Calculated Values

5.234	The current weight value (on verified scales or platforms with e = d, the last digit is bordered for identification)
20	A calculated value when using an application program, such as Counting or Weighing in Percent

Unit and Stability

g	The current weight unit (e.g. “g“)
pcs	Identifies additional characteristics (e.g. “pieces“ for the “Counting“ application) When the weighing system reaches stability, the weight unit or calculation unit is displayed here.

Data in Tare Memory, Calculated Value, Identification of the Active Weighing Platform when More Than One Platform is Used

⚠ Identification of calculated values (values not used in legal metrology)

B/G NET Indicates gross value or net value (data in tare memory)

PT Indicates manual tare input (using a barcode scanner) when viewing tare information.

WP1 Display of the active weighing platform when 2 platforms are connected. The display flashes for a ISO Cal adjustment prompt if WP 1 is an IS-weighing platform.

WP When the timer is active (Setup:Device Parameters: Operating Parameters:Timer), the symbol flashes to indicate that the set time has halfway expired.

Application, Printing and Battery Symbols

Printing in progress

GMP-compliant printout active

Battery status: 'Battery fully charged' or 'Battery empty'

Bar Graph

The bar graph shows the percentage of the weighing platform's capacity that is "used up" by the load on the scale (gross value).

0% Lower load limit

100% Upper load limit

The following symbols indicate tolerance levels for checkweighing:

Bar graph showing 10% intervals

Minimum for "checkweighing"

Target value for "checkweighing"

Maximum for "checkweighing"

Application Symbols

Symbol for the Counting application

Symbol for "checkweigher" counting down to "zero"

Symbols for the Totalizing, Checkweighing, Classification, Net-total Formulation, Weighing in Percent, Counting (with or without reference sample updating) and Neutral Measurement application programs.
For details on the symbols, please see the chapters for the respective application programs in the manual.

Text Lines The text lines show operator support information, such as IDs and user guidance prompts.

Soft Key Line This line shows the abbreviations or symbols that indicate soft key functions.

LEDs

LEDs indicate
- whether the weight exceeds tolerance limits for checkweighing
- the weight value classification for the Classification application

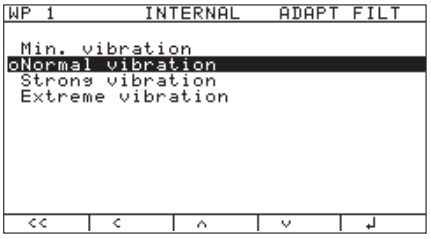
Error Codes

- If a key is inactive, "--------" and/or "No function"N is displayed (2 sec.) and an acoustic signal (double- beep) is emitted
- Temporary errors are displayed for 2 seconds in the measured value/result line via an error code (e .g., INF 09); fatal errors (e .g., ERR 101) are displayed continuously until cleared via a restart.

  Error codes are described in detail in "Data Interfaces" in "Error Codes."

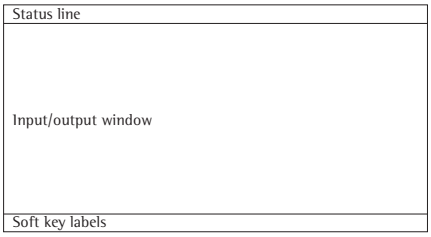
Menu Operating Design

Operating Example: Setup:Device parameters:
WP 1:Internal:Adapt Vlter
o Marks the current menu setting



Configuring parameters:
- ▶ Soft key "^" or "v": Parameter settings
- ▶ Soft key "↵": Confirm parameter
- ▶ SETUP or "<<": Exit Setup menu

Menu display



Display Mode for Configuration and Information (Setup)
The display is divided into three sections.

Status Line
Indicates the function of the current screen page. In the Setup program, this line shows the "path" to the data displayed.

Input and Output Window
For input and display of detailed information; e.g., for the selected application. Selected items are displayed inversely (white letters on a black background).

Soft key labels
See the description in this section.

Saving Menu Settings

The parameters selected in the menu remain saved when you switch to weighing mode or turn off the device.
You can block access to the Device parameters menu by requiring a password to prevent unauthorized or accidental setting changes (see also "Setting up Password Protection").

Configuration

You can configure the indicator by selecting parameters in the Setup menu. These are divided into the following groups (menu level 1), menu structure see section the “Setup Overview (Parameters)“ section

- Application parameters
- Fn key function
- Device parameters
- Info (device-specific information)
- Language

When used in legal metrology, not all parameters can be accessed. The indicator only displays parameters that can be selected.
Factory-set parameters are identified by an “o” in the list starting on the next page.

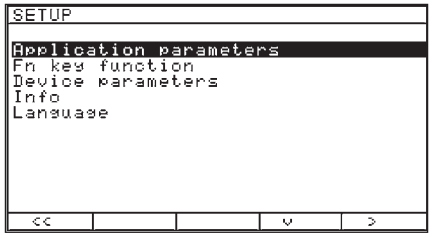
Setting the Language

You can choose from the following languages for displaying information:

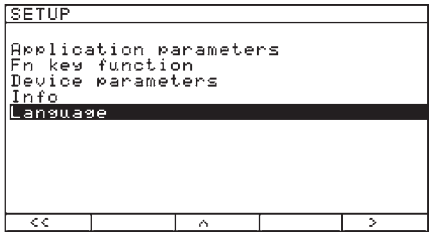
- Deutsch
- English (factory setting)
- U.S. mode
- Français
- Italiano
- Español

Example: Selecting “U.S. Mode“ for the language

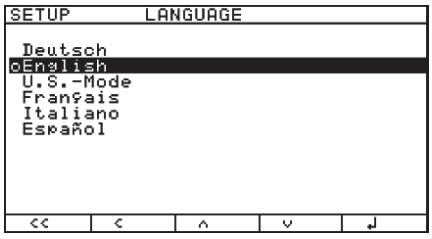
▶ Press (I/⏻) to turn on the device.
▶ Press (SETUP).
▷ The menu appears on the display.
▶ Press the “v“ soft key several times to select the “Language“ line.

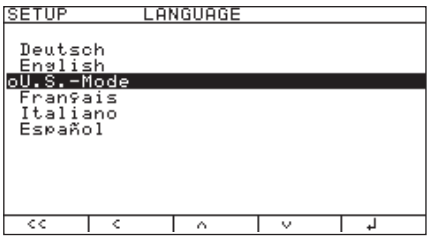


▶ Press the “>“ soft key.



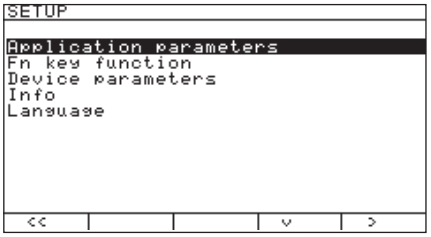
▷ The language selection appears on the display.
▶ Press the “^“ soft key to select the “U.S. mode“ line.



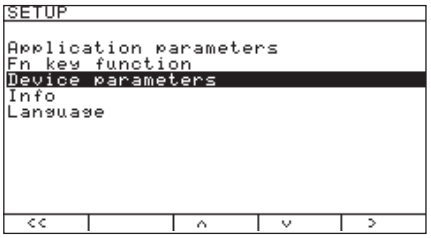


▶ Press the ↵ soft key to save the setting.
▷ The setting selection "o" moves to "U.S. mode."
▶ Press SETUP or << to exit the Setup menu.

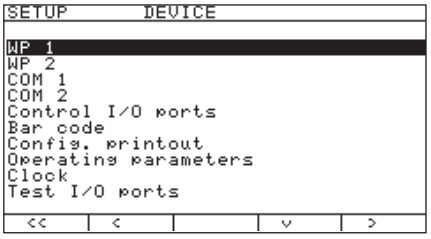
Setting up Password Protection



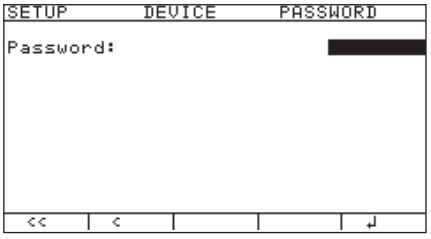
▶ Press I/⏻ to turn on the device.
▶ Press SETUP.
▷ The menu appears on the display.
▶ Press the "v" soft key several times to select the "Device parameters" line.



▶ Press the ">" soft key.

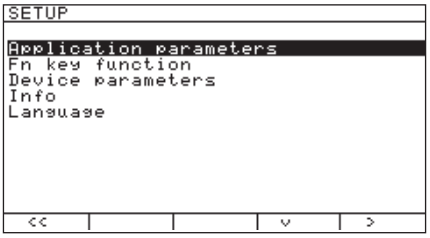


▶ Press the "v" soft key several times to select the "Password" line.

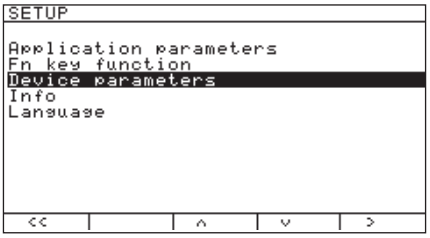


▷ The input line appears on the display.
▶ Enter numbers and/or letters via the keypad, see "Numeric Input via the Keypad" and "Letter Input via the Keypad."
▶ Press the "↵" soft key to save the setting.
▶ Press SETUP or "<<" to exit the Setup menu.

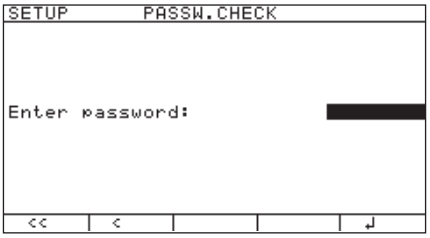
Setting up Password Protection



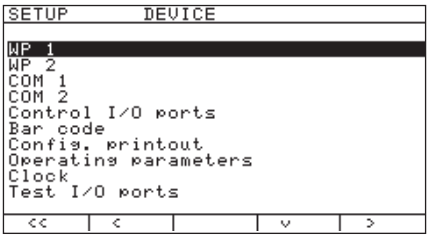
- ▶ Press (I/⏻) to turn on the device.
- ▶ Press (SETUP).
- ▷ The menu appears on the display.
- ▶ Press the "v" soft key several times to select the "Device parameters" line.



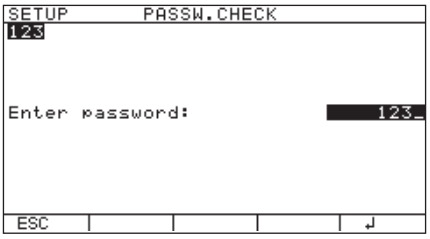
- ▶ Press the ">" soft key.



- ▷ The Access window appears on the display.
- ▶ Enter the password via the keypad, see "Numeric Input via the Keypad" and "Letter Input via the Keypad."
- ▶ Press the "↵" soft key.



- ▷ The device selection appears on the display.
- ▶ Press the "v" soft key several times to select the "Password" line.



- ▷ The input line appears on the display.
- ▶ Press (CF) several times to delete the password.
- ▶ Press the "↵" soft key to save the delete.
  If not yet saved, the process can be canceled using the "ESC" soft key.
- ▶ Press (SETUP) or "<<" to exit the Setup menu.

Printing Parameter Settings

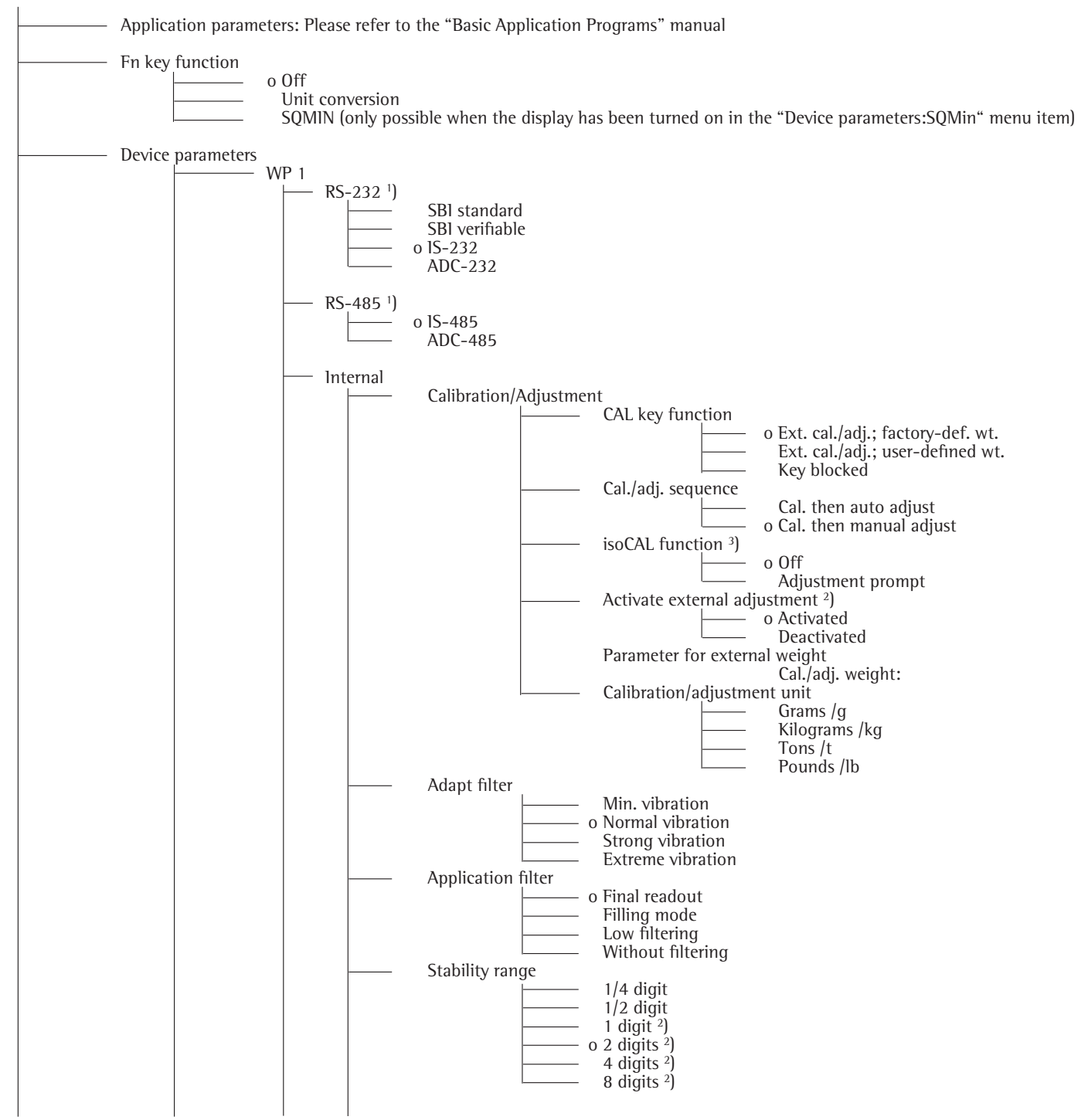
Example: Maximum 20 characters per line.

```
--------------------
12.01.2010     09:46
Type            CAIS3
Ser.no       12345678
Vers.     1.02.101110
BVers.       01-63-02
--------------------
SETUP
       DEVICE
--------------------
 WP 1
  Internal
 WP 2 off
 COM1
  Data communcations
   SBI
    Baud rate
           1200 Baud
    Parity
                 Odd
 Number of Stop bits
          1 Stop bit
      Handshake mode
     Hardware 1-char
 Number of data bits
               7 Bit
   Data output
Printout printer 1
```

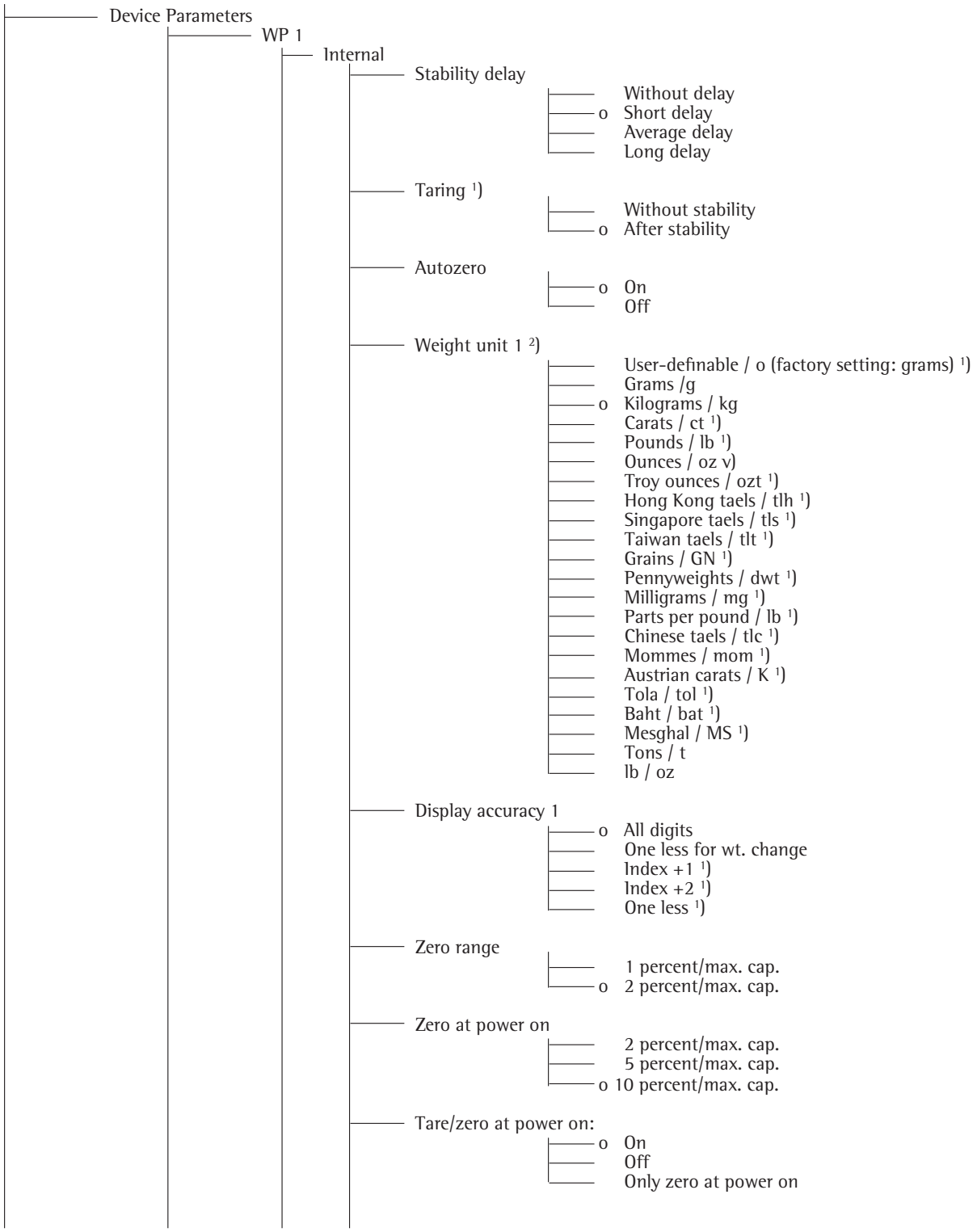
etc.

Setup Overview (Parameters)

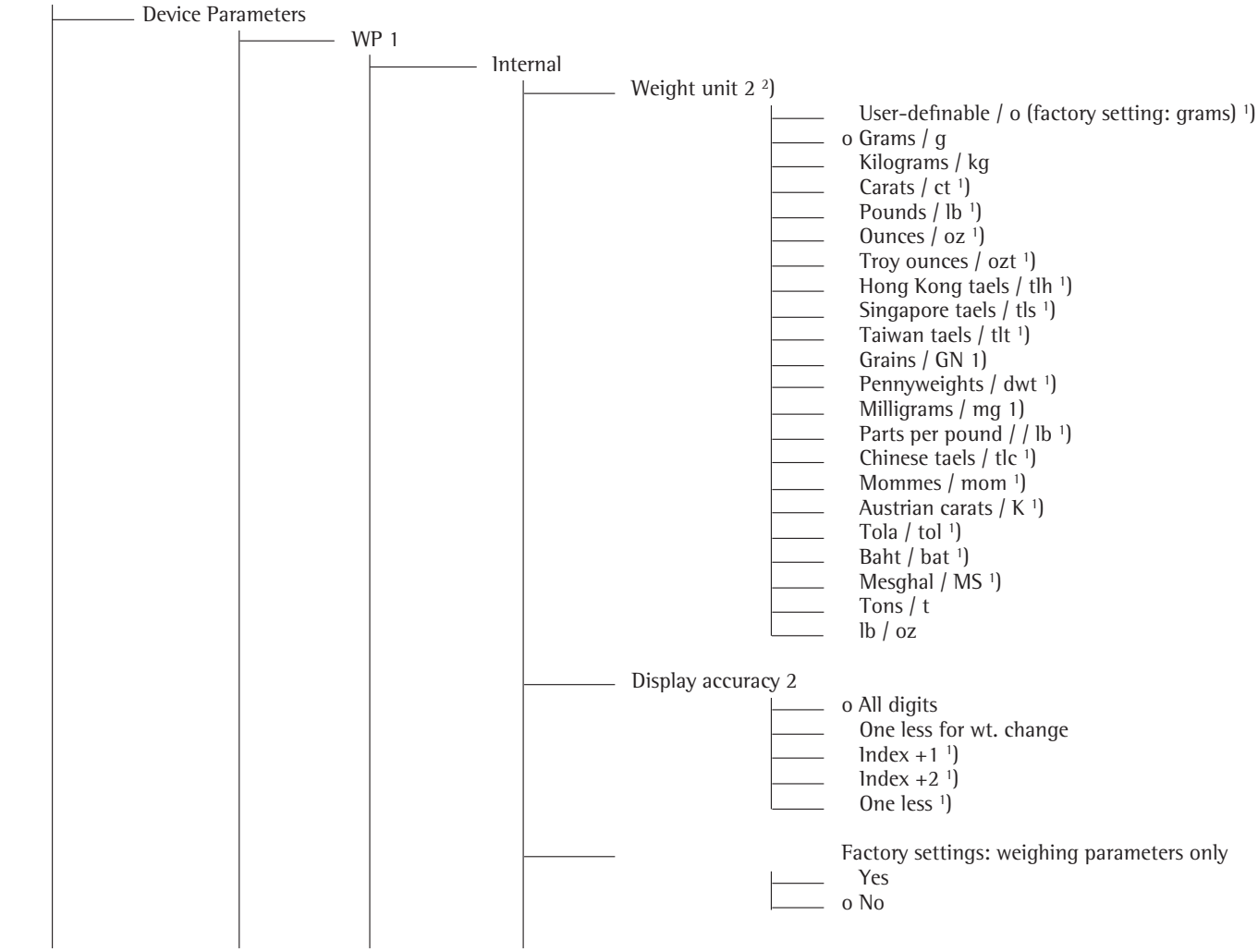
o = Factory settings
√ = User-defined setting



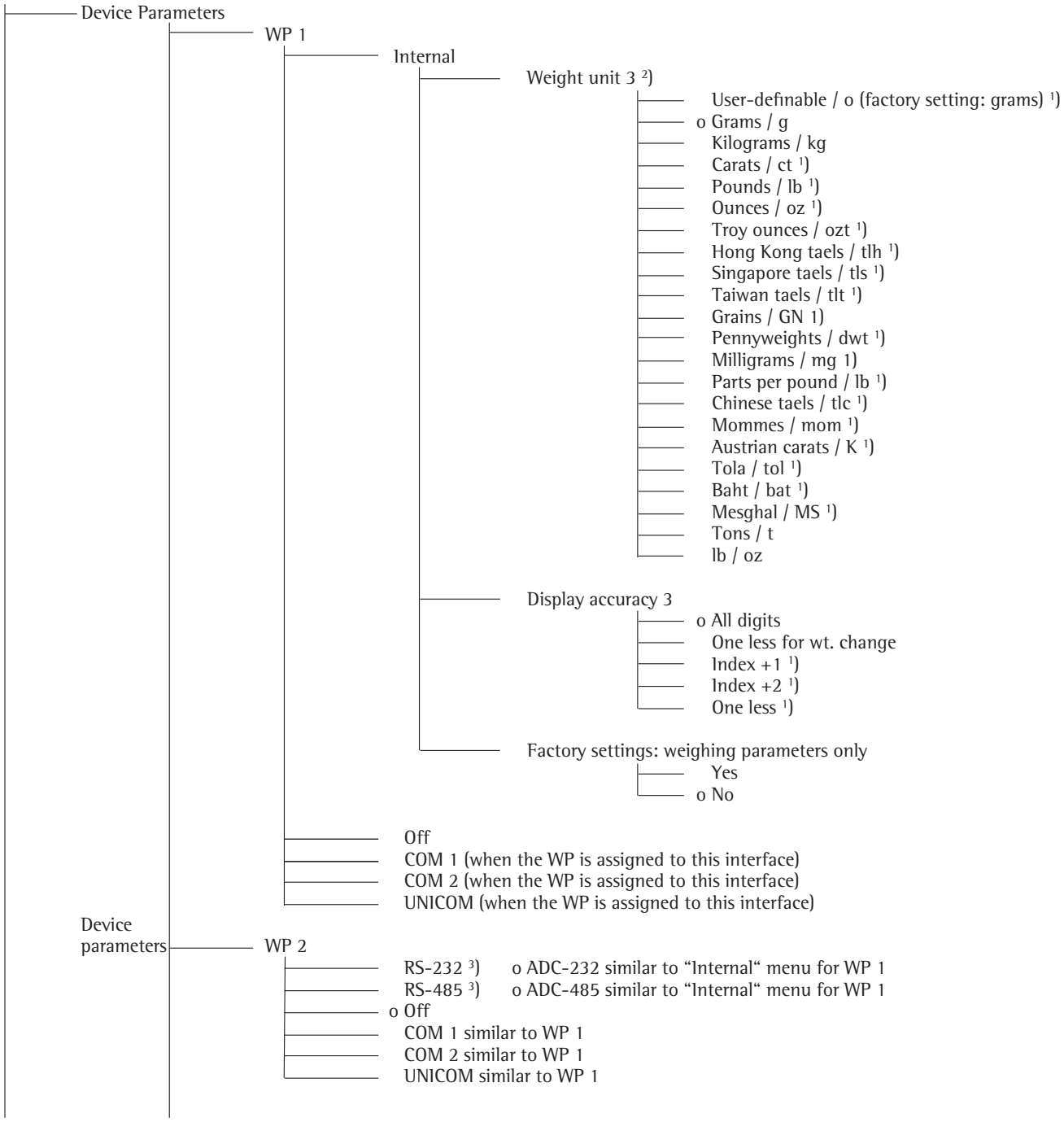
[1]) Equipment version: – then blocked internally
[2]) Not available on devices verified for use in legal metrology
[3]) Only when operated with Sartorius IS weighing platforms or an external ADC



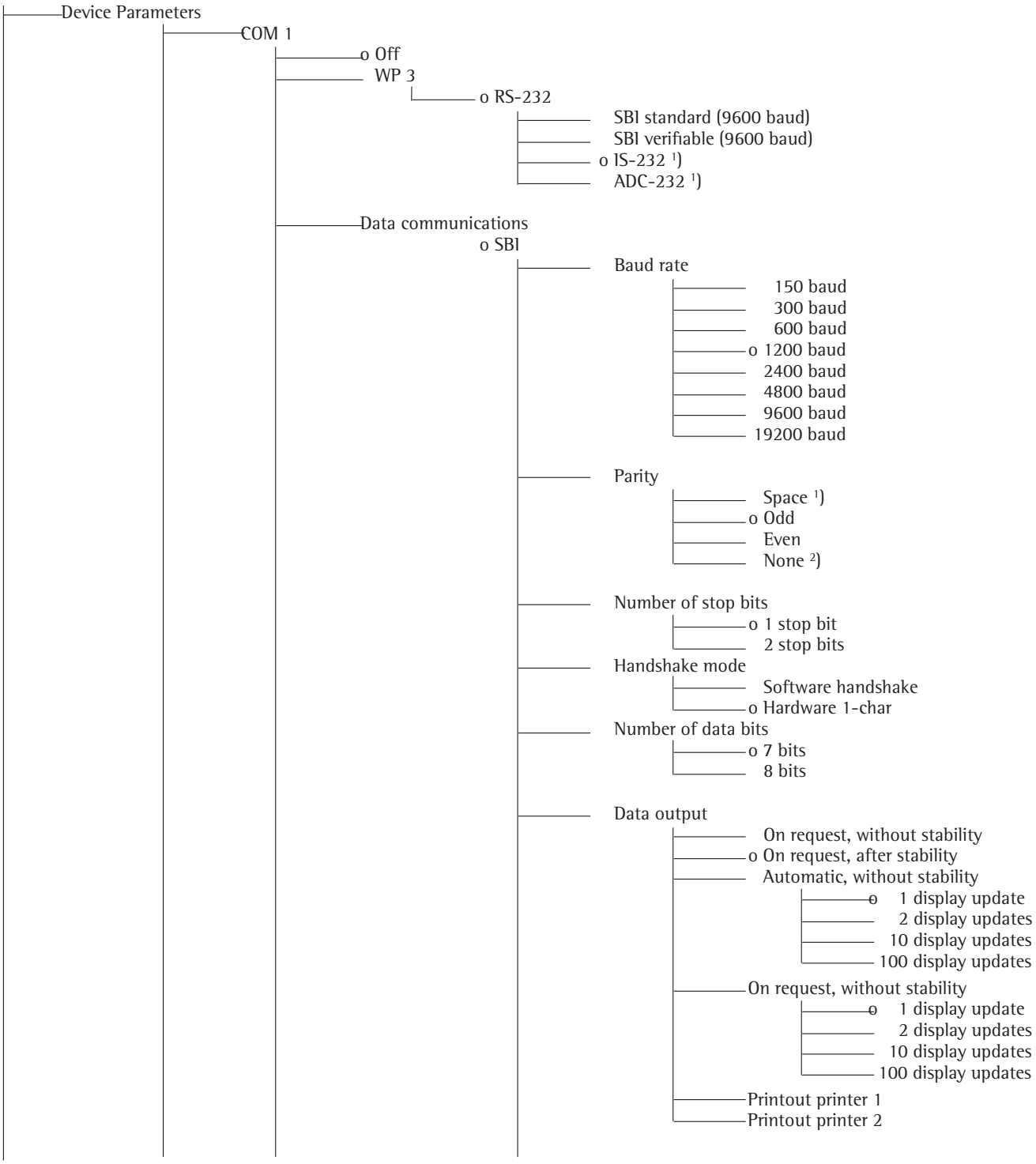
[1]) Not available on devices verified for use in legal metrology
[2]) Depends on weighing platform type



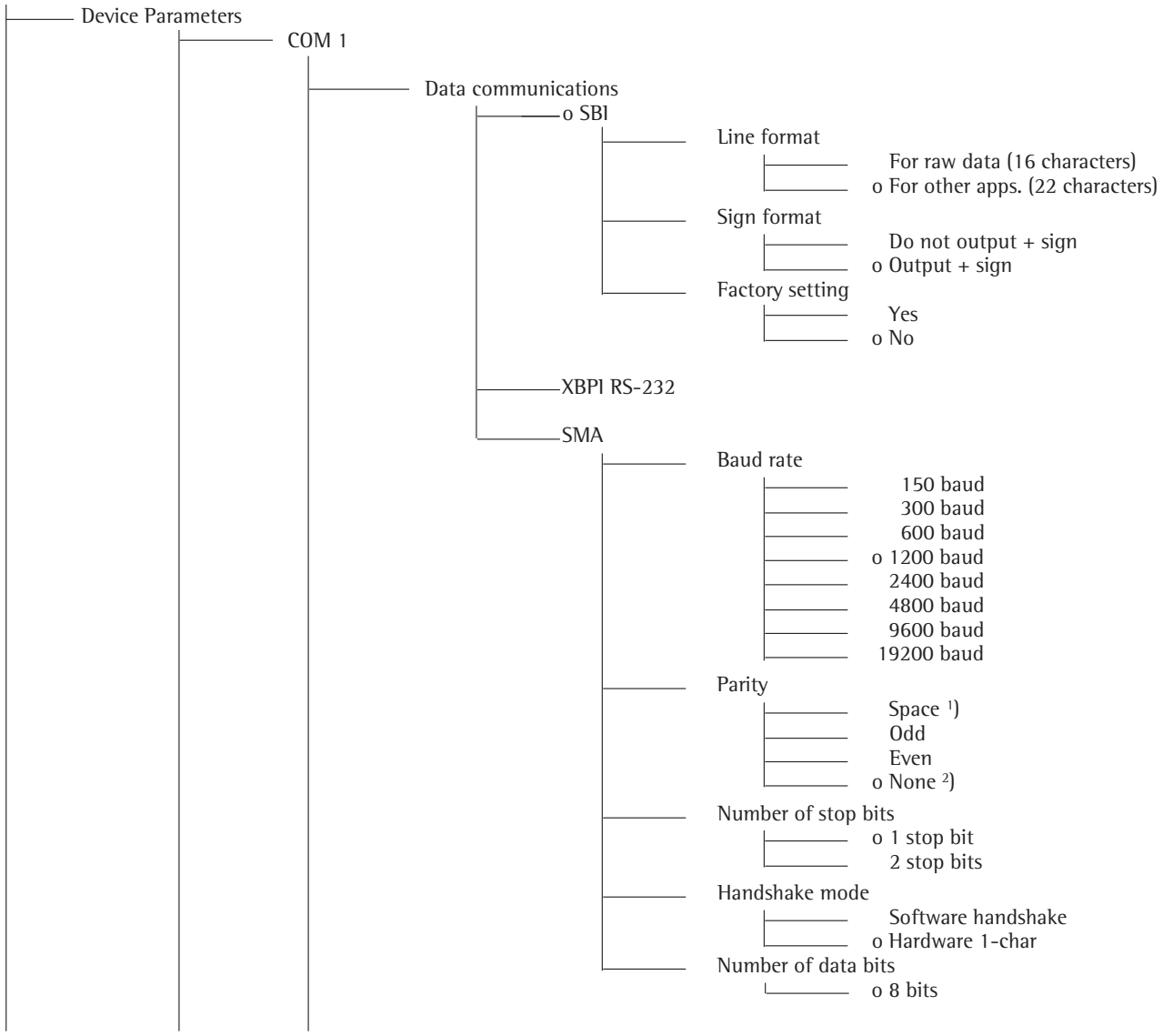
[1]) Not available on devices verified for use in legal metrology
[2]) Depends on weighing platform type


Device Parameters
WP 1
Internal
Weight unit 3 [2])
User-definable / o (factory setting: grams) [1])
o Grams / g
Kilograms / kg
Carats / ct [1])
Pounds / lb [1])
Ounces / oz [1])
Troy ounces / ozt [1])
Hong Kong taels / tlh [1])
Singapore taels / tls [1])
Taiwan taels / tlt [1])
Grains / GN 1)
Pennyweights / dwt [1])
Milligrams / mg 1)
Parts per pound / lb [1])
Chinese taels / tlc [1])
Mommes / mom [1])
Austrian carats / K [1])
Tola / tol [1])
Baht / bat [1])
Mesghal / MS [1])
Tons / t
lb / oz
Display accuracy 3
o All digits
One less for wt. change
Index +1 [1])
Index +2 [1])
One less [1])
Factory settings: weighing parameters only
Yes
o No
Off
COM 1 (when the WP is assigned to this interface)
COM 2 (when the WP is assigned to this interface)
UNICOM (when the WP is assigned to this interface)
Device parameters
WP 2
RS-232 [3])
o ADC-232 similar to "Internal" menu for WP 1
RS-485 [3])
o ADC-485 similar to "Internal" menu for WP 1
o Off
COM 1 similar to WP 1
COM 2 similar to WP 1
UNICOM similar to WP 1

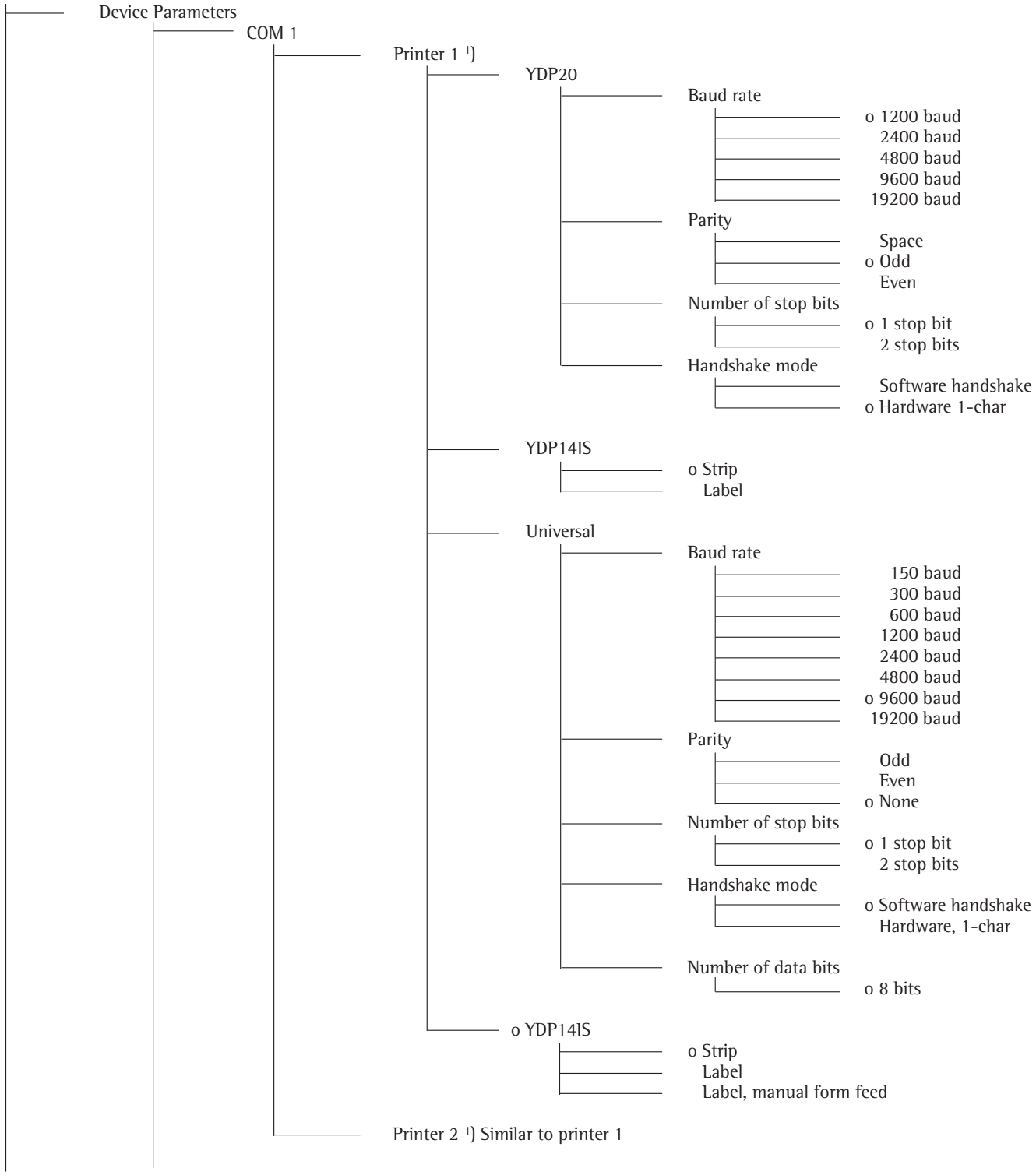
[1]) Not available on devices verified for use in legal metrology
[2]) Depends on weighing platform type
[3]) Equipment version



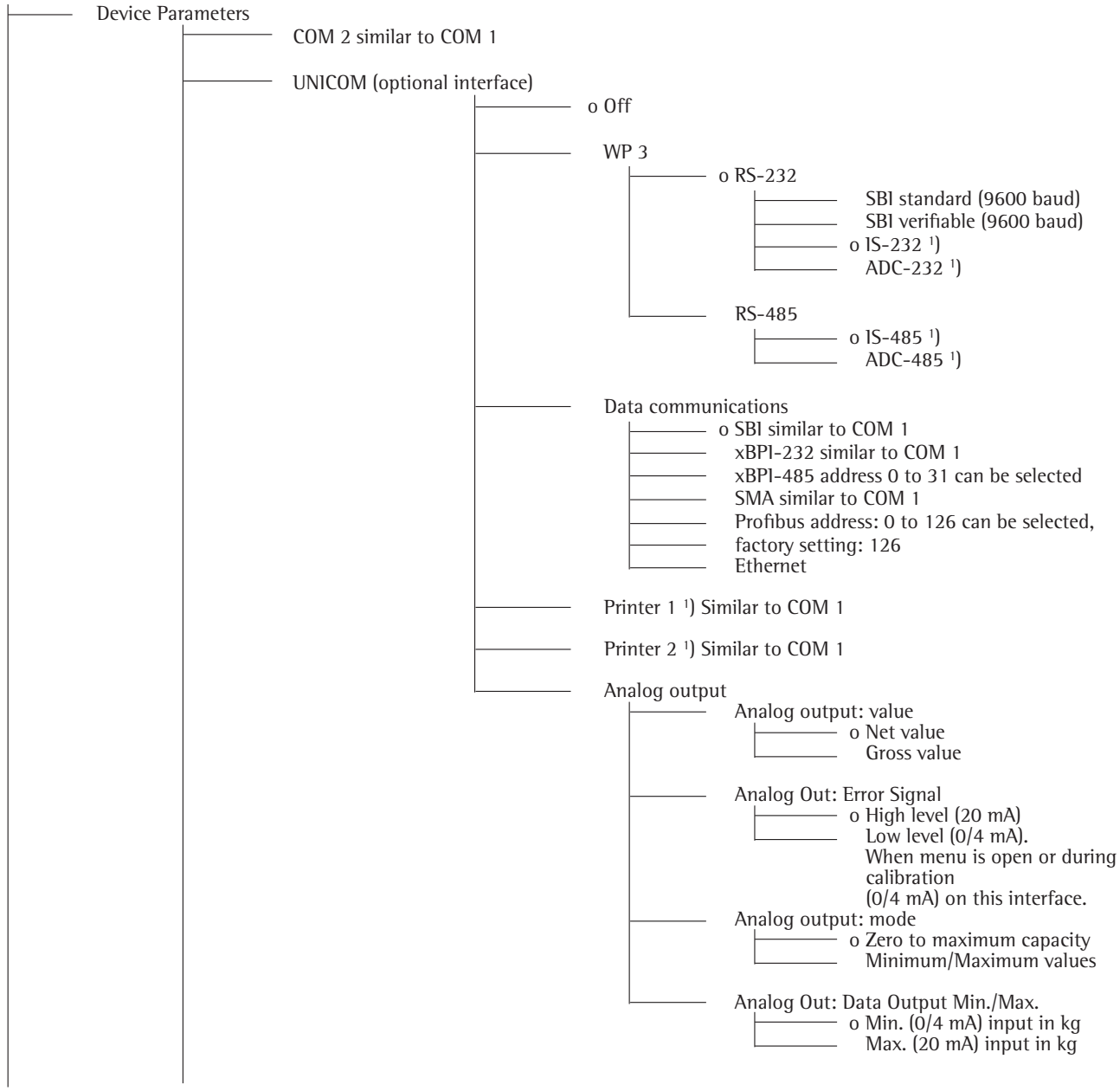
[1]) Not with 8 data bits
[2]) Not with 7 data bits



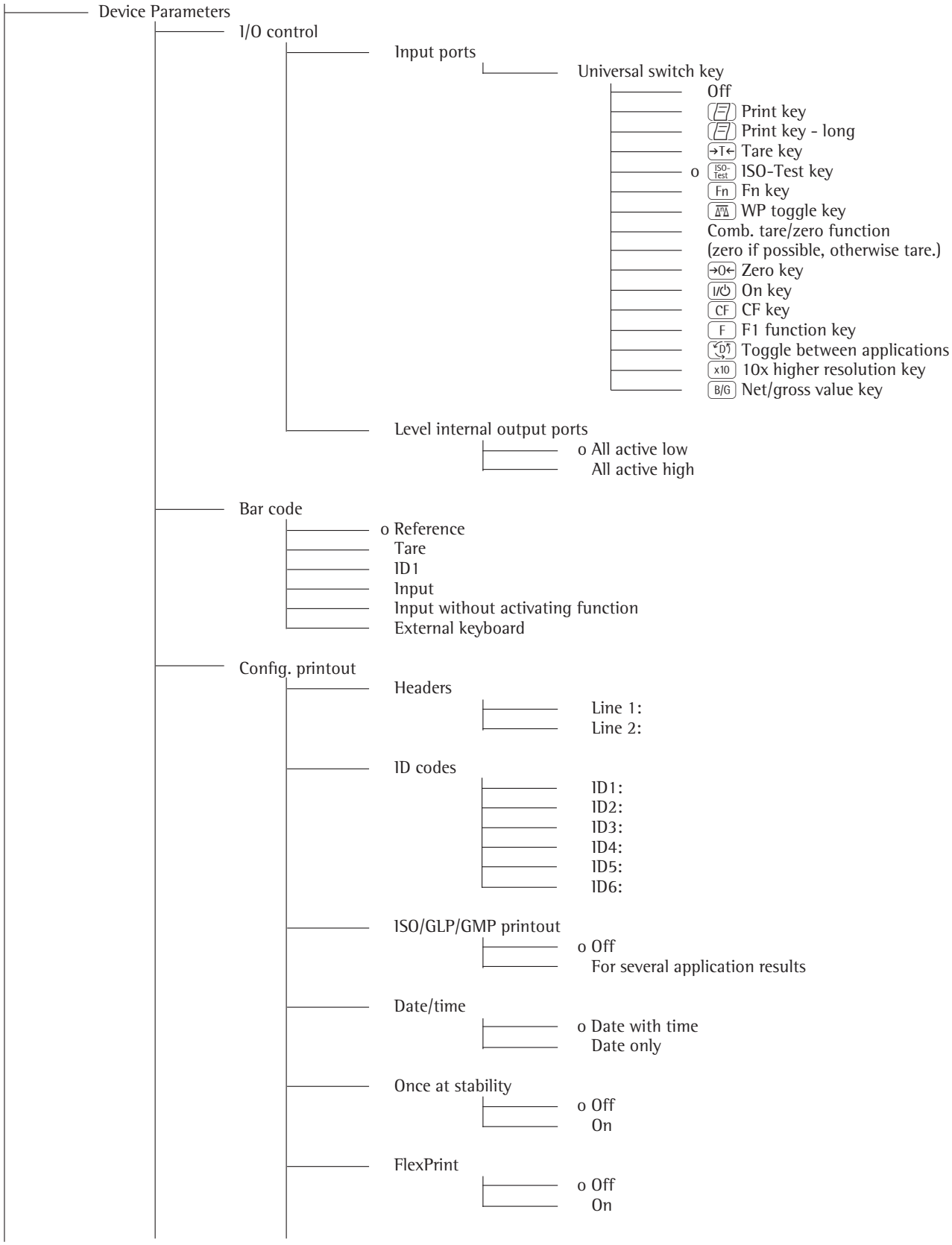
1) Not with 8 data bits
2) Not with 7 data bits

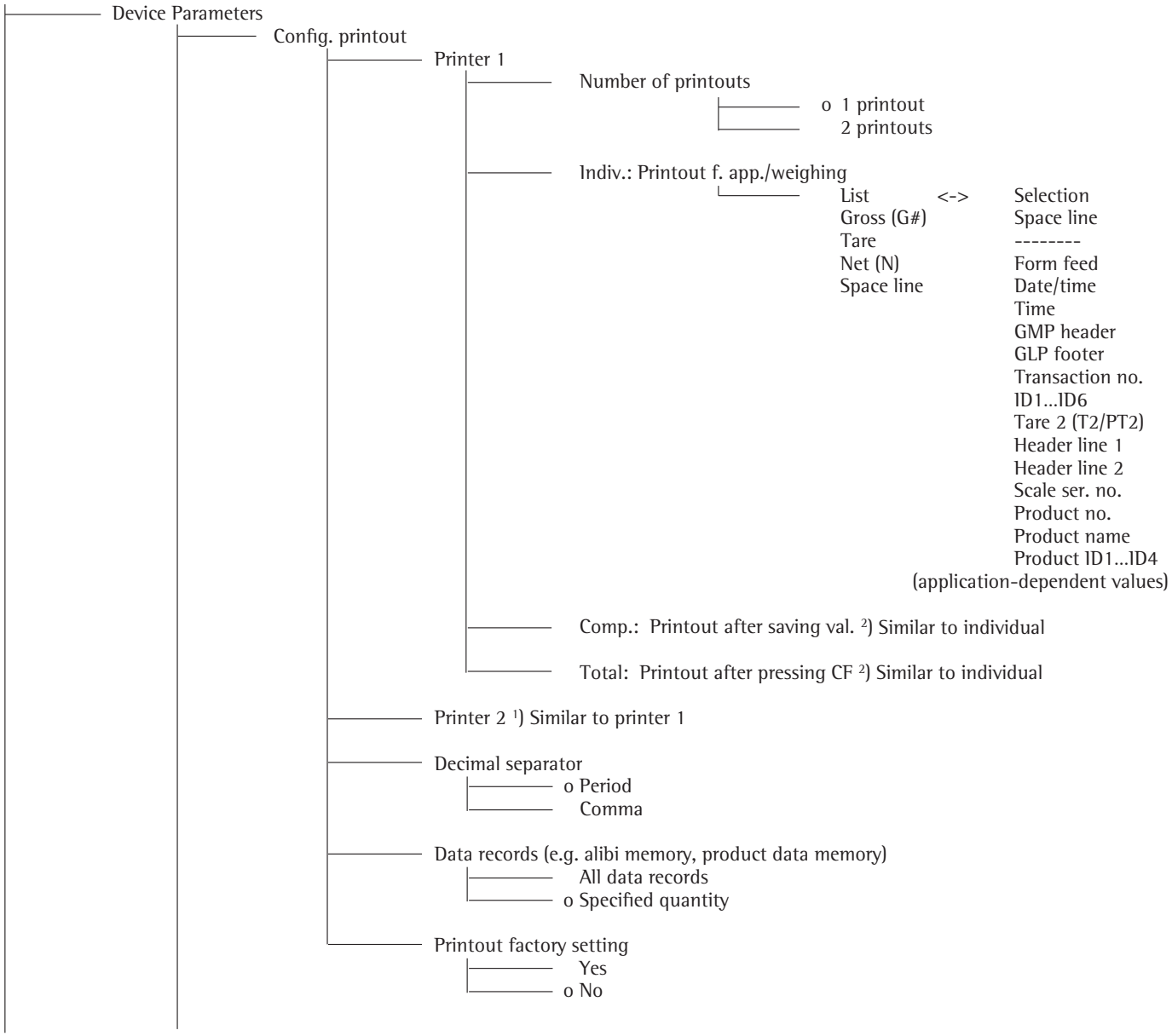


[1]) Max. 2 printers can be configured

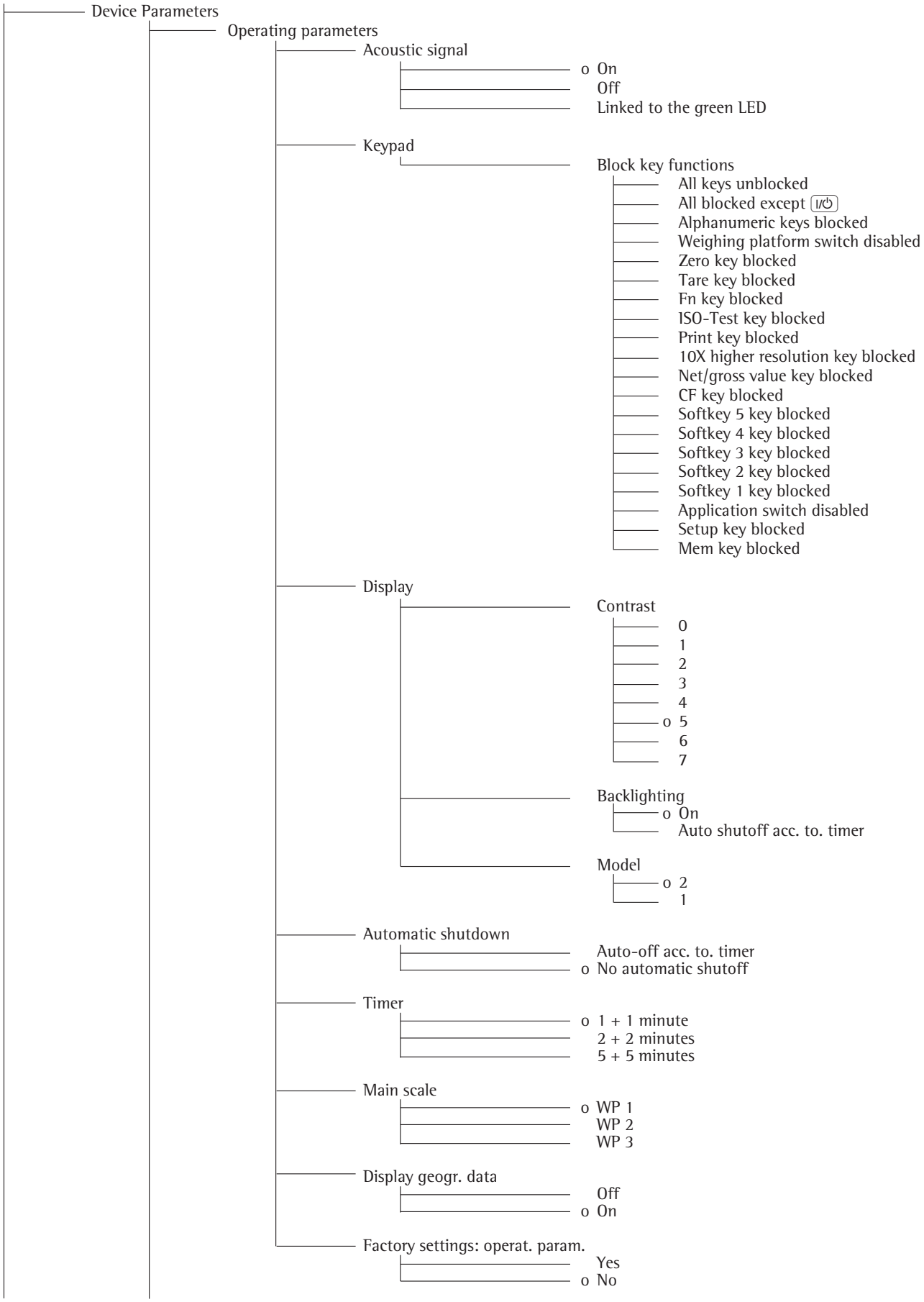

Device Parameters
COM 2 similar to COM 1
UNICOM (optional interface)
o Off
WP 3
o RS-232
SBI standard (9600 baud)
SBI verifiable (9600 baud)
o IS-232 [1])
ADC-232 [1])
RS-485
o IS-485 [1])
ADC-485 [1])
Data communications
o SBI similar to COM 1
xBPI-232 similar to COM 1
xBPI-485 address 0 to 31 can be selected
SMA similar to COM 1
Profibus address: 0 to 126 can be selected,
factory setting: 126
Ethernet
Printer 1 [1]) Similar to COM 1
Printer 2 [1]) Similar to COM 1
Analog output
Analog output: value
o Net value
Gross value
Analog Out: Error Signal
o High level (20 mA)
Low level (0/4 mA).
When menu is open or during calibration
(0/4 mA) on this interface.
Analog output: mode
o Zero to maximum capacity
Minimum/Maximum values
Analog Out: Data Output Min./Max.
o Min. (0/4 mA) input in kg
Max. (20 mA) input in kg

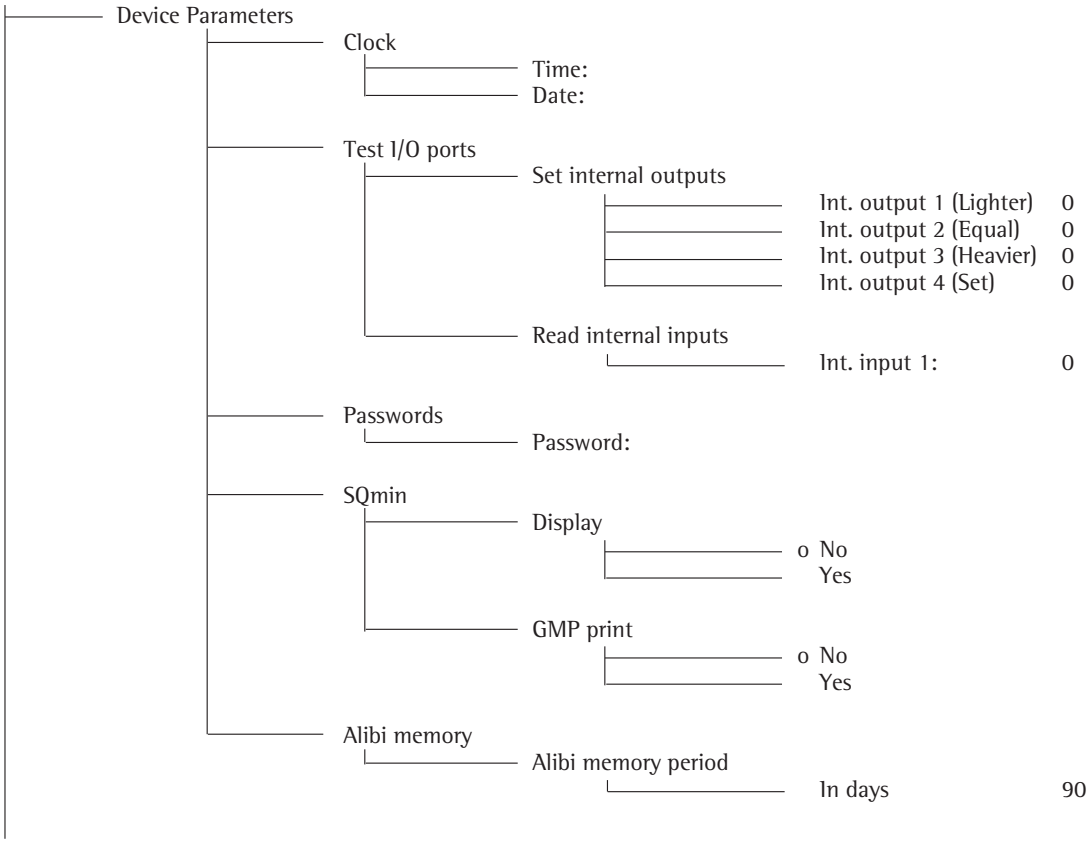
[1]) Not with 8 data bits

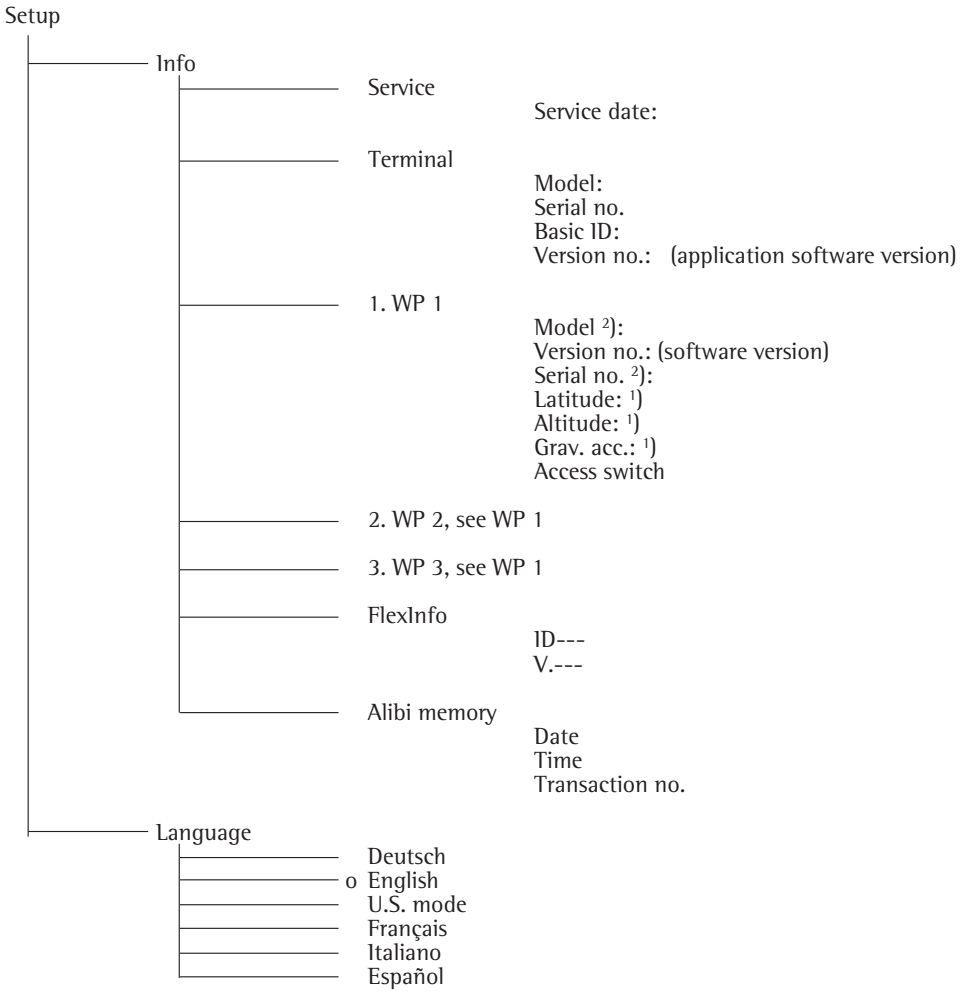

Device Parameters
I/O control
Input ports
Universal switch key
Off
Print key
Print key - long
Tare key
o ISO-Test key
Fn key
WP toggle key
Comb. tare/zero function
(zero if possible, otherwise tare.)
Zero key
On key
CF key
F1 function key
Toggle between applications
10x higher resolution key
Net/gross value key
Level internal output ports
o All active low
All active high
Bar code
o Reference
Tare
ID1
Input
Input without activating function
External keyboard
Config. printout
Headers
Line 1:
Line 2:
ID codes
ID1:
ID2:
ID3:
ID4:
ID5:
ID6:
ISO/GLP/GMP printout
o Off
For several application results
Date/time
o Date with time
Date only
Once at stability
o Off
On
FlexPrint
o Off
On



1) Max. 2 printers can be configured
2) Only when "Totalizing" and/or "Net total" has been selected under "Application parameters:Application 3"


Device Parameters
Operating parameters
Acoustic signal
o On
Off
Linked to the green LED
Keypad
Block key functions
All keys unblocked
All blocked except I/⏻
Alphanumeric keys blocked
Weighing platform switch disabled
Zero key blocked
Tare key blocked
Fn key blocked
ISO-Test key blocked
Print key blocked
10X higher resolution key blocked
Net/gross value key blocked
CF key blocked
Softkey 5 key blocked
Softkey 4 key blocked
Softkey 3 key blocked
Softkey 2 key blocked
Softkey 1 key blocked
Application switch disabled
Setup key blocked
Mem key blocked
Display
Contrast
0
1
2
3
4
o 5
6
7
Backlighting
o On
Auto shutoff acc. to. timer
Model
o 2
1
Automatic shutdown
Auto-off acc. to. timer
o No automatic shutoff
Timer
o 1 + 1 minute
2 + 2 minutes
5 + 5 minutes
Main scale
o WP 1
WP 2
WP 3
Display geogr. data
Off
o On
Factory settings: operat. param.
Yes
o No


Device Parameters
Clock
Time:
Date:
Test I/O ports
Set internal outputs
Int. output 1 (Lighter) 0
Int. output 2 (Equal) 0
Int. output 3 (Heavier) 0
Int. output 4 (Set) 0
Read internal inputs
Int. input 1: 0
Passwords
Password:
SQmin
Display
o No
Yes
GMP print
o No
Yes
Alibi memory
Alibi memory period
In days 90



1) Depending on configuration prior to verification: either latitude/altitude or gravitational acceleration
2) Not displayed for internal ADC

Operation

Weighing

This application is always available during operation.

Features

- Zeroing by pressing →0←
- Storing the weight on the platform as a tare by pressing →T←
- Tare container weight automatically
- Use a barcode scanner to enter tare weight
- Use the numeric keys 0 to enter a tare weight and press →T← to save
- Delete tare values using the CF key and save using the →T← key
- Toggle the display using the Fn key between:
- 1st and 2nd weight unit
- SQmin
- You can configure the Fn key function in the "Fn key" Setup menu
- 10-fold increased resolution using the x10 key
- Weighing using up to three weighing platforms
- Individual numeric ID codes for weight values
- Print weight values:
- Manually, by pressing
- GMP printout (see "Data Interfaces")
- Automatic printout
- Automatic data output (see "Data Interfaces")
- Restore factory settings in the Setup menu:
„Application parameters:Factory settings:
only application:Yes"

Soft Key Functions

ID	Enter up to six ID codes for identifying results on the printout
1st ID	Save the value entered as the first ID code.

Preparation

- ▶ Select Setup: Press SETUP.
- ▶ Select Application parameters: Press the ">" soft key.
- ▶ Select "Application 1 (basic settings)":
  Press the ">" soft key.
- ▶ Confirm the "Weighing" application: Press the "↵" and "<" soft keys.
- ▶ Select the "Min. load f. auto. taring/printout" function:
  Press the ">" soft key.
- ▶ Confirm the "o 10 digits" setting:
  Press the "↵" and "<" soft keys.
- ▶ Select the "Factory setting" menu item: Press the ">" soft key.
- ▶ Confirm the "o No" setting: Press the "↵" and "<" soft keys.
- ▶ To save settings and exit the Setup menu: Press the SETUP key or the "<<" soft key.

Automatic Taring

The first weight on the scale that exceeds the preset minimum capacity is stored in the tare memory at stability. The values for subsequent loads are stored as weight values.
The scale returns to the initial state when the load on the scale is less than 50% of the minimum load.

Operating Menu Setting: "Application parameters: Autotare 1st weight:Yes"

Minimum load for automatic taring and automatic printing

To tare container weights automatically, you need to set a minimum load in the Setup menu, under:
"Application parameters:Min. load f. auto. taring/printout:o 10 digits"

You can set the following for the minimum load:
1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale intervals for the connected weighing platform. If the interval is 1 g and 1000 digits are required, the minimum load is 1000 g (1000 intervals).
If the weighing platform interval is 5 g and the same number of digits as above are required, the minimum load is 5000 g.
Once the minimum load has been exceeded, the weighing platform is tared automatically and/or an automatic printout is generated.

Automatic Printing

The first weight value that exceeds the minimum load is printed. If the menu item is also activated for automatic taring, it is only tared when the minimum load is exceeded. In this case, an automatic printout would only be generated when the second weight value exceeds the minimum load.

Setting in the Setup Menu: "Device parameters:ConVg. printout:Once at stability:On"

Weighing using up to three weighing platforms

Press the [⚖] key to toggle between three weighing platforms.

Main scale: first platform displayed on start-up
You can select the weighing platform to be displayed first when the device is turned on in the Setup menu:
"Device parameters:Operating parameters:Main scale:oWP 1"
Press [⚖] to toggle the readout between platforms.

Using a barcode scanner to enter tare weight
The tare weight of the container can be entered via a barcode scanner.
Operating Menu Setting: "Device parameters:Bar code:oTare-value"
The value is applied and saved automatically. The content of the tare memory can be displayed in Info mode by pressing the [i] key.

Using a barcode scanner to enter application parameters
Application parameters (reference value) can be entered via a barcode scanner.
Operating Menu Setting: "Device parameters:Bar code:oReference-value"
The value is applied and saved automatically.

Using a barcode scanner to enter an identifier
Identifiers can be entered via a barcode scanner.
Operating Menu Setting: "Device parameters:Bar code:oID"
The value is applied and saved automatically.

Scanning barcodes directly
You can directly scan a barcode using the barcode scanner.
Operating Menu Setting: "Device parameters:Bar code:oInput"
The barcode can contain the following codes:
- "I" for write identifier
- "T" for save tare memory
- "R" for write reference weight
- "A" for activate product data memory

Examples:
"I4Anton" = write the character string to ID 4: Anton
"TC1" = write 1 Kg to the preset tare memory.
"C" = unit: Kilograms
"B" = grams
"D" = carat,
etc.
"RC0.0023" = write 0.0023 kg as the reference weight
"A1" = load product data memory 1

Adjustment/Configuration counter for standard scales

Purpose Automatic recording of changes to adjustment and weighing parameters using two independent counters. The values remain saved for the life of the component.

▶ To display both counters, press and hold the →0← key for longer than 2 seconds.
▷ The “Configuration counter“ is then shown in the weight display for 3 seconds (identified by a “P“). Then the “Adjustment counter“ is displayed for another 3 seconds (identified by a “C“). After 6 seconds, the information display turns off automatically.

Adjustment Counter Features:

- Counter limited to 9999
- Counter at “C 0000“ for hardware commissioning
- Counter cannot be reset
- Counter is updated automatically when:
- linearization, calibration/adjustment/preload change is successful
  - user calibration, adjustment or linearization weight is changed
  - When the following parameters are changed:
  - Function ISO-Test key
  - Zeroing range
  - Initial zero point range
  - The above parameters are reset to factory settings

Configuration Counter Features:

- Counter limited to 9999
- Counter at “P 0000“ for hardware commissioning
- Counter cannot be reset
- Counter is updated automatically when:
  - When the following parameters are changed:
  - Installation location
  - Application filter
  - Stability range
  - Taring
  - Auto zero
  - Weight unit 1
  - Weight unit 2
  - Weight unit 3
  - The above parameters are reset to factory settings
  - Turning the application automatic taring on/off
  - Restore application parameters to factory settings

Device Parameters

Password Protection

Access to device and application parameters can be password-protected against unauthorized changes in the Setup menu under "Device parameters: Password," see the "Setting up Password Protection" section in the "Operating Design" chapter.

Acoustic Signal

An acoustic signal (single beep for active, double beep for inactive keys) is emitted when you press a key.
The acoustic signal can be turned on/off and linked to the green LED in the Setup menu under "Device parameters:Operating parameters:Acoustic signal."

Keys

Keys can be blocked/unblocked in the Setup menu under "Device parameters:Operating parameters:Keys." The following settings are available:

- All keys unblocked (default setting)
- All blocked except I/⏻ and Setup
- Alphanumeric keys blocked
- ⚖ blocked
- →O← blocked
- →T← blocked
- Fn blocked
- ISO-Test blocked
- 🖩 blocked
- x10 blocked
- B/G blocked
- CF blocked
- Soft key 1...5 blocked
- ↶D↷ blocked
- Setup blocked
- CF blocked

Automatic Shutoff of Combics

You can specify that the indicator will shut off after a set time has elapsed in the Setup menu under "Device parameters:Operating parameters:Automatic shutoff,"

Display Lighting

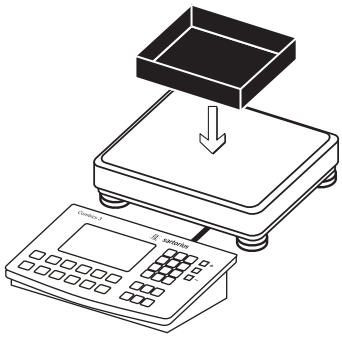
The following settings can be made for display lighting in the Setup menu under "Device parameters:Operating parameters: Display:"

- Contrast
- Backlighting
- Model

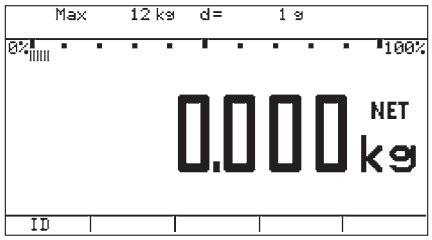
Timer

The timer used to turn the device and/or display lighting on/off can be set to 2, 4, or 10 minutes in the Setup menu under "Device parameters: Operating parameters:Timer."

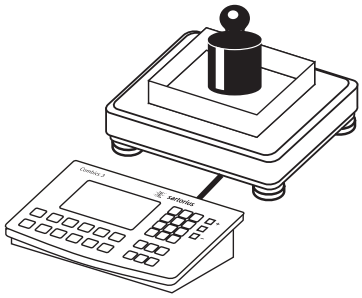
Tare the scale by placing a container on the weighing platform



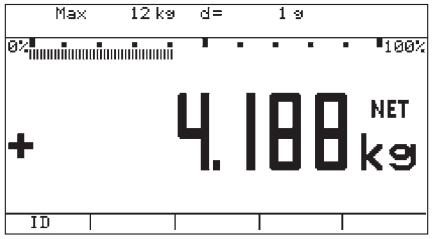
- ▶ Press the I/⏻ key to turn on the indicator.
- ▷ The automatic self-test runs.
  When the weight readout is shown, the scale is ready to operate and automatically set to zero. With no load on the platform, you can zero the weighing platform at any time by pressing →0←.
- ▶ Place empty container on the scale.
- ▷ The container weight is displayed.
- ▶ Press the →T← key to tare the scale.
  Note: If the automatic tare function is enabled, you do not need to press the →T← key. The tare weight is saved automatically when you place the container on the platform.



- ▶ Wait until a zero value is displayed together with the "NET" symbol (net weight).



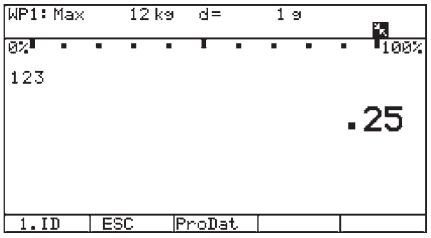
- ▶ Place sample on the platform.



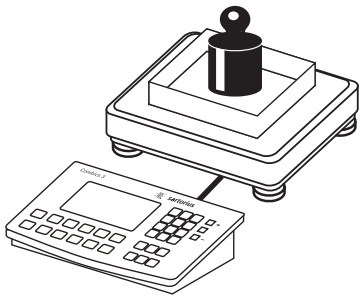
- ▶ Wait until the weight unit symbol is displayed (indicating stability).
- ▶ Read the weight value.

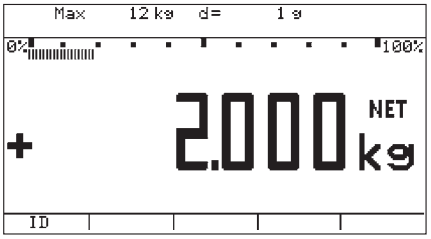
Weighing with numeric entry of tare value and printing the results.

- ▶ Press the I/⏻ key to turn on the indicator.
- ▷ The automatic self-test runs.
  When the weight readout is shown, the scale is ready to operate and automatically set to zero. With no load on the platform, you can zero the weighing platform at any time by pressing →0←.
- ▶ Press the · 2 5 key to enter a known tare weight via the keypad (in this example, 0.25 kg).
- ▶ Press the →T← key to apply the tare weight.

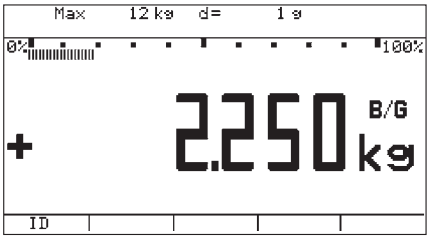


- ▶ Place the container with sample on the platform.

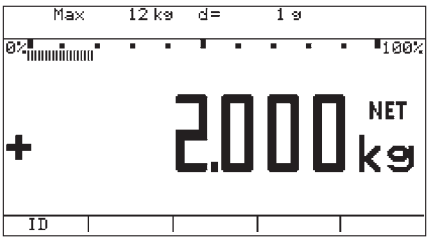




- ▶ Read the results.



- ▶ Press the B/G key to toggle the display to the net weight value.
- ▷ The display shows the gross weight (in this example, 0.250 kg for the container plus 2.000 kg for the sample).



▶ Press the B/G key to toggle back to the previous display.

▶ Press the key to print the results.
▷ Start of GMP header (only if GMP-compliant printout is configured).

```
--------------------
24.10.2010    10:09
Typ   CAW3P1-12ED-L
Vers.   1.02.101110
BVers.     01-63-02
--------------------
EISENSCHMIDT
GOETTINGEN
Chargen-Nr.   123456
Kunde         Schulze
24.10.2010     10:09
--------------------

G#     +    2.250 kg
T      +    0.000 kg
PT2    +    0.250 kg
N      +    2.000 kg
--------------------
--------------------
24.10.2010    10:10
Name:

--------------------
```

End of GMP header
Headers

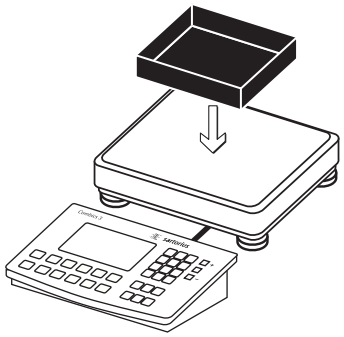
Identifiers

Start of GMP footer (only if GMP-compliant printout is configured)

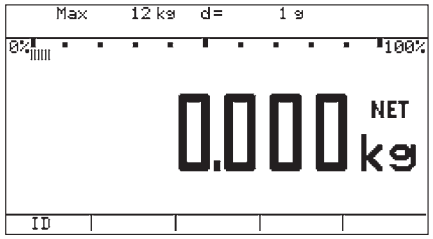
End of GMP footer

Weighing with variable tare values, printing results, deleting tare values

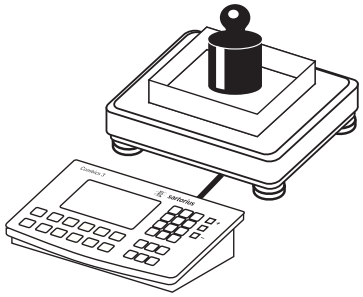
- ▶ Press the [I/⏻] key to turn on the indicator.
- ▷ The automatic self-test runs.
  When the weight readout is shown, the scale is ready to operate and automatically set to zero. With no load on the platform, you can zero the weighing platform at any time by pressing [→0←].



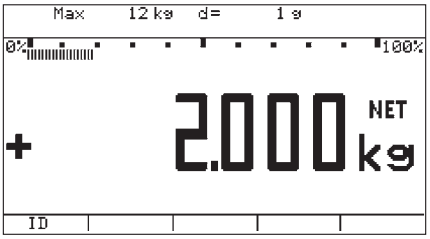
- ▶ Place empty container on the scale.
- ▶ Press the [→T←] key to tare the scale.
  Note: If the automatic tare function is enabled, you do not need to press the [→T←] key. The tare weight is saved automatically when you place the container on the platform.



- ▶ Wait until a zero value is displayed together with the "NET" symbol (net weight).



- ▶ Place a packaged sample in the container.
- ▶ Press the [·] [2] [5] key to enter the known tare weight of the package via the keypad (in this example, 0.25 kg).
- ▶ Press the [→T←] key to apply the package weight that was entered.
  Both tare weights are added together.

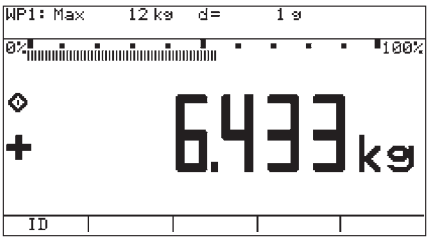


▶ Read the Net weight.

```
G#     +      6.433 kg
T      +      4.183 kg
PT2    +      0.250 kg
N      +      2.000 kg
--------------------
```

▶ Press the (F) key to print the results.

▶ Press the 0 key.
▶ Press the →T← key to apply the entered value.
▷ The tare values are deleted. The gross value appears on the display.




```
G#     +      6.433 kg
T      +      0.000 kg
N      +      6.433 kg
--------------------
```

▶ Press the (F) key to print the results.

Calibration, Adjustment

Purpose Perform **calibration** to determine the difference between the value displayed and the actual weight on the platform. Calibration does not entail making any changes within the weighing equipment.

During **adjustment**, the difference between the measured value displayed and the true weight of a sample is corrected, or is reduced to an allowable level within maximum permissible error limits.

Configuration for Use in Legal Metrology

M Configuration of the weighing instrument for use in legal metrology is set by a switch. The switch is located on the back of the weighing platform and covered by a protective cap.

Using a verified scale in legal metrology in the EU:
The Type-Approval Certificate for verified scales is only valid for non-automatic weighing instruments. For automatic operation with or without additional, integrated equipment, please follow the applicable national regulations for the installation location.

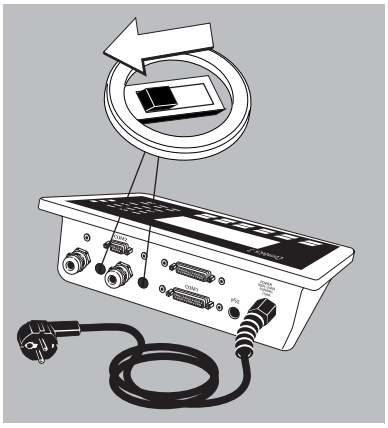
Externally Connected IS Scales: Before use in legal metrology, the scale should be adjusted via the internal adjustment equipment at the installation location: see chapter “Configuring Weighing Platforms,“ section “Internal Adjustment.“

⚠ The temperature range (°C) listed on the ID label should not be exceeded during operation.

For Servicing: External adjustment for verified scales of accuracy class (III)
- External adjustment is blocked in legal metrology (switch cover is sealed)
- External adjustment is only possible by removing the seal. If the seal is broken, the validity of verification will become void and you must have your scale re-verified.

Using a verified scale in legal metrology with internal adjustment equipment:
▶ Before use in legal metrology, the “internal adjustment“ function should be carried out at the installation location:

Opening the Menu Access Switch The menu access switch is located on the back of the indicator right next to the weighing platform connection.



▶ Remove the cap.
▶ Slide the switch to the left (= “open“ position, for use in legal metrology).

ⓘ You can determine the position of the switch in the Setup menu under “Info:WP.“

Features Which of the following features are available depends on the connected weighing platform. These features are configured in the Setup menu:

- Internal adjustment for several CAH models
- External adjustment blocked in verified weighing instruments
- External adjustment with the default weight value or user-defined weight (not available on verified instruments) under "...Calibration/adjustment:CAL key function."
- Specify the weight for external calibration/adjustment under "...Calibration/adjustment:Parameter for external weight"
- Internal adjustment for IS weighing platforms (configure under "COM1:, COM2: or UNICOM:WP3")
- Block the ISO-Test key to prevent the use of the functions described above under "...Calibration/adjustment:CAL key function."
- Calibrate first; then adjust automatically or manually (not for verified weighing instruments) under "...Calibration/adjustment: Cal/adj. sequence."
- For Sartorius IS weighing platforms only: Flashing WP symbol as adjustment prompt (if more than one weighing platform is connected, the platform number is also displayed) under "...Calibration/adjustment:CAL key function."
- Block/Unblock external adjustment under "...Calibration/adjustment:Activate ext. adj."
- Altitude and latitude or gravitational acceleration displayed after "Cal" is displayed at the start of the calibration/adjustment process if these values are supported by the weighing platform under "Device parameters:Operating parameters: Display geogr. data." For each of these parameters, the term is displayed first (Altitude, Latitude or Gravity) for 1 second, and then the corresponding value is displayed continuously until you press ISO-Test.

External calibration and manual adjustment with default weights (weighing parameters: factory settings)

Preparation

- ▶ Select Setup menu: Press the SETUP key.
- ▶ Select Device parameters: Press the "**>**" soft key.
- ▶ Select weighing platform "**WP 1**," "**WP 2**:" Press the "**>**" soft key or
- ▶ Select interface "**COM 1**," "**COM 2**" or "**UNICOM**" (depending on the interface): Press the "**>**" soft key.
- ▶ Select weighing platform "**WP 3**:" Press the "**>**" soft key.

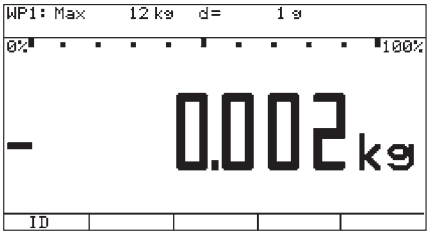
Calibration/Adjustment
- CAL key function
  - o Ext. cal./adj.; factory-def. wt.
  - Ext. cal./adj.; user-defined wt.
  - Key blocked
- Cal./adj. sequence
  - Cal. then auto adj.
  - o Cal. then manual adj.
- isoCAL function (for Sartorius IS weighing platforms only)
  - o Off
  - Adjustment prompt
- Activate ext. adj.
  - o Activated
  - Deactivated
- Parameter for external weight

o = Factory setting

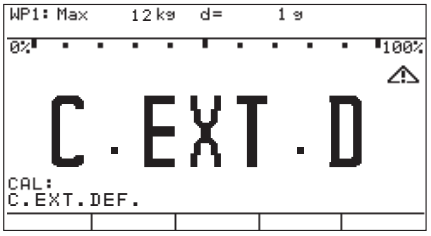
- ▶ To save settings and exit the Setup menu: Press the SETUP key or the "**<<**" soft key.

Procedure

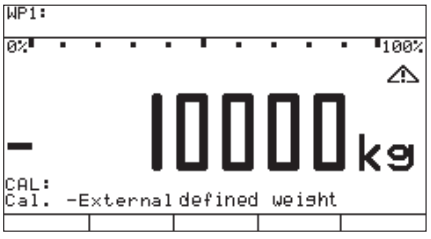
- ▶ Zeroing the scale by pressing the →0← key.

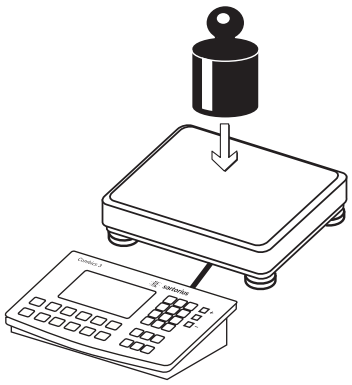


- ▶ Start calibration/adjustment using the ISO-Test key.
- ▷ The display "**C.EXT.D**" appears for two seconds.

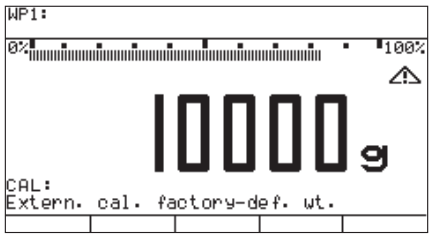


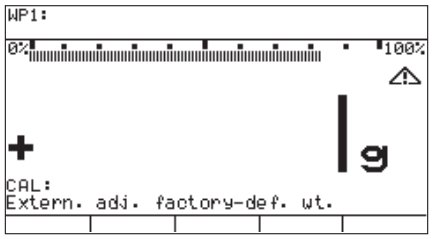
- ▷ You are prompted to place the required calibration/adjustment weight on the platform (e.g., 10 ,000 g).





▶ Place the calibration/adjustment weight on the weighing platform.

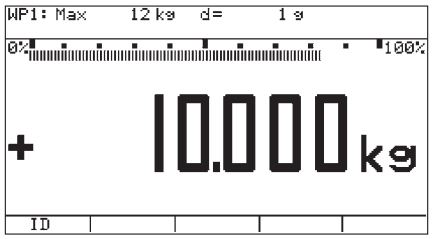




▷ The difference between the measured value and the true weight of the sample will be displayed with plus/minus signs.

```
External calibration
Nom.  +       10000 g
Diff. +           1 g
```

▷ A printout will be generated if the adjustment is not carried out and the procedure is stopped by pressing the →0← key.



▶ Start adjustment via the ISO-Test key (cancel calibration/adjustment via →0←).
▷ The adjustment weight is displayed once adjustment is finished.

```
--------------------
24.10.2010    10:15
Type           CAIS3
Vers.no. 1.02.101110
BVers.     01-63-02
--------------------
External calibration
Nom.  +       10000 g
Diff. +           1 g
External  adjustment
Diff. +           0 g
--------------------
24.10.2010    10:15
Name:

--------------------
```

▷ A GMP-compliant printout is generated.

Internal adjustment for CAH Models...

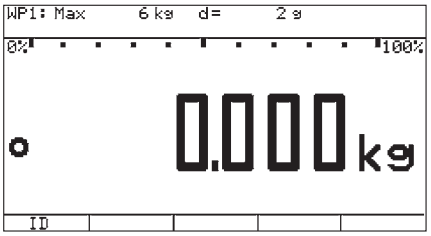
System Requirements

- The menu item "`Intern. cal./adjust.`" is preset for scales with internal adjustment.
- The scale housing has a built-in motorized adjustment weight.
- The calibration/adjustment sequence is preset to manual adjustment in the "`Calibration/adjustment:Cal/adj. sequence: Cal. with manual adjust.`," see section "Function Allocation of the ISO-Test Key for Calibration/Adjustment"

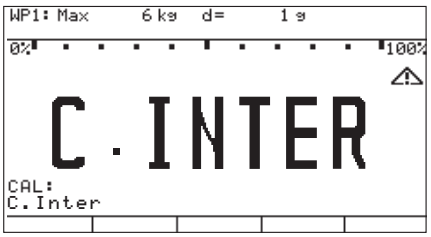
Example: **Internal calibration and then adjustment** (weighing parameters: factory settings for CAH... models)

Procedure

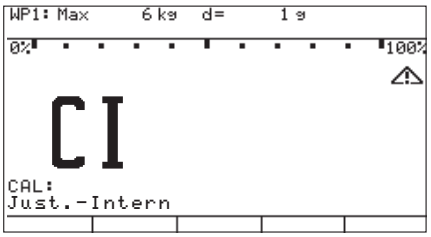
▶ Press the →0← key to unload and zero the scale.



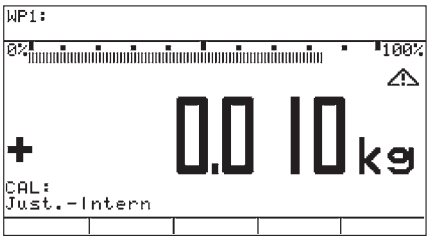
▶ Press ISO-Test to start the internal calibration.
▷ The display "`C.INTER`" appears while the internal adjustment weight is placed on the platform.



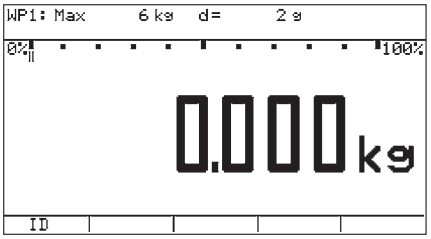
▷ Then the display "`CI`" appears.



▷ After a brief pause, the difference since the last span adjustment is displayed.
▶ Press ISO-Test to start internal adjustment or press →0← to cancel the calibration/adjustment.



▷ When calibration/adjustment is complete, the GMP-compliant printout is generated. If the adjustment procedure is canceled (only calibration is performed), the last two lines, "Internal adjustment" and "Diff. + 0.000 kg" are not printed.
▷ The device is now in normal weighing mode.



SQmin Function

Purpose

To display the allowable minimum sample quantity “SQmin” (sample quantity minimum) in accordance with the United States Pharmacopoeia (USP). According to USP guidelines, the uncertainty of measurement may not exceed 0.1% of the sample quantity when substances are weighed with the highest degree of accuracy for volume determination. This additional function ensures that weighing results lie within defined tolerance limits corresponding to the requirements of your quality assurance system.

System Requirements

The scale must be set up by a service technician to be able to use the SQmin function. The technician will determine the permitted minimum sample quantity and set this on your balance using your QA system‘s guidelines. He will document this setting via a “Weighing module test as per USP“ certificate in which the measurements and min. sample quantity are logged. The SQmin function ensures that the weighing results correspond to USP guidelines. These SQmin settings cannot be changed by the user.

Features

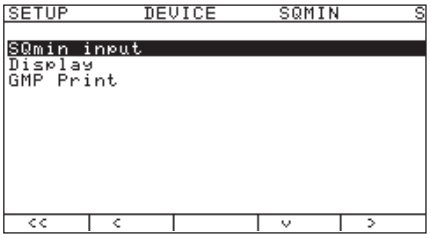
- Displaying the minimum sample quality:
  The value is displayed in the text line for 4 seconds after pressing the Fn key.
- If the minimum sample quantity has not been reached: The ⚠symbol is displayed and weight values are marked with a “!“ in the printout.
- GLP header: The minimum sample quantity entered for SQmin can be included on the printout.

SQmin Operation

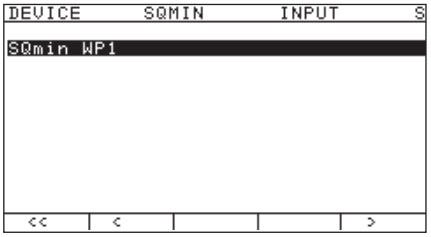
Configuration in Service Mode

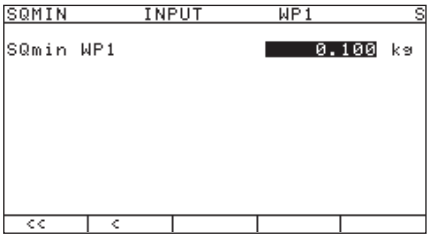
The SQmin value can only be entered in Service mode.

- ▶ Remove the cap.
- ▶ Slide the menu access switch to the left (= "open" position).
  If the device is part of a verified weighing facility, this will only be possible if the verification seal is broken. The weighing equipment must then be verified again.
- ▶ Activate the Service mode, see "Service Mode."
- ▶ In the "Device parameters" menu, select "SQmin" and open using the ">" soft key.
- ▶ Select "SQmin input" using the ">" soft key.



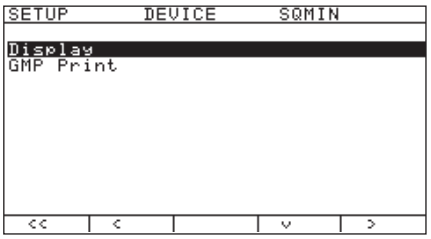
- ▶ Select "SQmin WP1" using the ">" soft key, enter the value via the keypad (in this example 0.100 kg) and save using the "↵" soft key or cancel using "ESC."
- ▶ Then enter the values for WP 2 and WP 3.
- ▶ Press SETUP or "<<" to exit the Setup menu.
- ▶ Slide the menu access switch to the right (= "closed" position) and reattach the cap.
- ▷ The device is now in normal weighing mode.

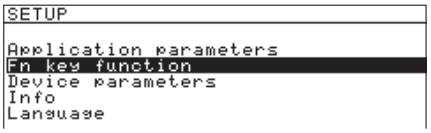




Configuration in Weighing Mode

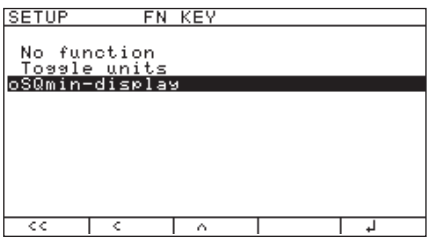
- ▶ In the "Device parameters" menu, select "SQmin" and open using the ">" soft key.
- ▶ Select "Display.".
- ▶ Open using the ">" soft key.
- ▶ Confirm the factory setting "oYes" using the "↵" soft key.
- ▶ Press the "<" soft key several times to switch to the next highest menu.





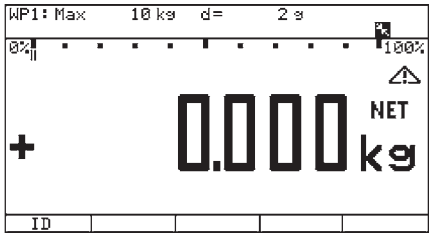
The SQmin display must be turned on to use the SQmin function.

- ▶ In the "Fn key:SQmin display:" menu, select using the ">" soft key and confirm using the "↵" soft key.
- ▶ Press SETUP or "<<" to exit the Setup menu.



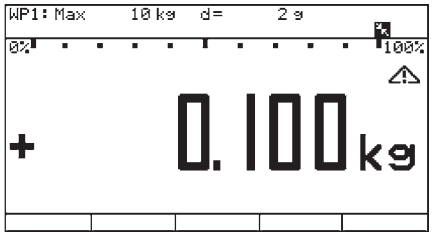
Procedure

▶ Place the container for the sample on the scale and press the →T← key to tare.



▶ Place the sample on the scale.
▷ The minimum sample quantity is not reached (symbol ⚠).
▶ Press the 🖹 key to generate the printout.

▶ Place another sample on the scale.
▷ The minimum sample quantity is exceeded (no symbol ⚠).
▶ Press the 🖹 key to generate the printout.



▶ Briefly press the Fn key to toggle between the measured value and SQmin value.
▷ The value for the minimum sample quantity is displayed for four seconds.

Data ID Codes

You can assign codes (such as product name, batch number, etc.) for identification of measured values in all application programs.

Features

- Assign up to six ID codes.
- Assign both a name and a value to each ID code.
- Displaying individual IDs: press the "ID" soft key.
- The name is left-justified and the value is right-justified on the printout. If the entire code is too long for one line, additional lines are printed.
- Enter ID code names in Setup under: "Device parameters:ConVg. printout:ID codes."
- The name can have a max. of 20 characters. When entering the ID value, no more than 11 characters are displayed during input; however, all 20 characters are printed.
- Enter up to 21 characters for the value of the ID code. Press the "ID" soft key to activate the input mode.
- Enter the first ID value directly through the numeric keypad. Press the "1st ID" soft key to save the value.
- Individual characters of the ID can be deleted using the →0← key. Complete ID code values can be deleted using the "Delete" soft key.
- If both the name and value fields are empty, no ID code is printed.
- In the Setup menu, you can configure when and whether ID codes are printed (see included "Application Programs" instructions, "Configuring Printouts").

Settings for individual ID codes

Setup menu: "Device parameters:ConVg. printout:

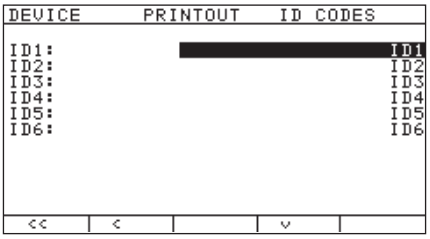
Factory settings for ID code names:
ID1: "ID1"
ID2: "ID2"
ID3: "ID3"
ID4: "ID4"
ID5: "ID5"
ID6: "ID6"

There are no factory settings for ID code values.

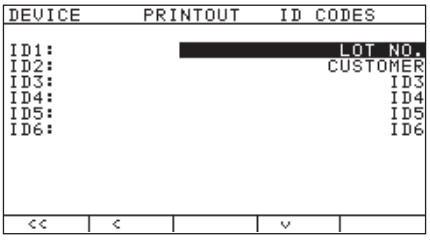
Using Individual ID Code

Example Enter ID code names. “Batch no.“ and “Customer“ should be entered for ID 1 and ID 2.

▶ Press the SETUP key and select “Device parameters:ConVg. printout:ID codes.“



▷ The first line is selected.



▶ Press the ABC key to enter “Batch no.“ via the keypad, see also chapter “Operating Design,“ sections “Text Input via the Keypad“ and “Special Character Input via the Keypad.“
▶ Press the “↵“ soft key to save the entry.
▶ Press the “v“ soft key to select the second line.
▶ Press the ABC key to enter “Customer“ via the keypad, see also “Operating Design,“ “Text Input via the Keypad.“
▶ Press the “↵“ soft key to save the entry.
▶ Press SETUP or “<<“ to exit the Setup menu.

Example
Enter ID code values. The values “123456“ and “Smith“ should be entered for ID 1 and ID 2.

▶ Press the “ID“ soft key.

▷ The first line is selected.

▶ Press the key to enter “123456“ via the keypad, see also “Operating Design,“ “Number Input via the Keypad.“
▶ Press the “↵“ soft key to save the entry.

▶ Press the “v“ soft key to select the second line.
▶ Press the ABC key to enter “Smith“ via the keypad, see also “Operating Design,“ “Text Input via the Keypad.“
▶ Press the “↵“ soft key to save the entry.
▶ Press the “<<“ soft key to exit the menu.

Data Interfaces

The indicator is equipped with the following data interfaces:
- **COM1:** Standard data interface (RS-232)
- **COM2:** Standard data interface (RS-232)
- **UniCOM:** Universal data interface (optional)

Interfaces can be configured in the Setup menu for different input and output functions (e.g. printer, 3rd weighing platform, PC, checkweighing).
The optional UniCOM interface can be used as an RS-232, RS-485/RS-422 or analog output (voltage/current interface, galvanically separated digital I/Os, profibus, Ethernet), see also “Accessories.“
A barcode scanner or a keyboard can be connected via the PS/2 -socket or the corresponding screw terminals (IP69K).

Features
- IP44 indicator:
  Connect via a 25-pin D-Sub female connector
- IP69K indicator:
  Route the connecting cable from the peripheral device to the indicator via a cable gland. The free cable ends are connected via the screw terminals.

Warning when using third-party RS-232 connecting cables:
The pin assignments may not be compatible with Sartorius equipment.
Check the pin assignment against the cabling diagrams and disconnect any lines that are not assigned. Failure to do so may cause malfunction, damage or even completely ruin your indicator and/or peripheral device(s).

Specifications

Serial interface:

Interface operating mode:	Full duplex	
Level:	COM1:	RS-232,
	COM2:	RS-232,
	UniCOM (optional):	RS-232 or RS-422/485 half duplex
Connection:	CAW*P devices (IP44 protection): 25-pin D-Sub socket CAW*S devices (IP69K protection): Connection via screw terminals in the housing, cable routed into the housing via a cable gland.	
Transmission rate:	150, 300, 600, 1200, 2400, 4800, 9600, 19200 baud (depending on the operating mode)	
Number of data bits:	7, 8 bits	
Parity:	Space, odd, even, none (depending on the operating mode)	
Number of stop bits:	1 or 2	
Handshake mode:	Software (XON/XOFF), hardware (1 character after CTS)	
Protocols:	SBI, XBPI-232 [2], XBPI-485 [1][2], SMA, Profibus (UniCOM only) various printers: – YDP01IS – YDP02IS label – YDP01IS label – Universal – YDP02 – YDP04IS – YDP03 – YDP04IS label – YDP02IS – YAM01IS Alibi memory	
Network address[3]:	0, 1, 2, ..., 31	
SBI: Manual data output:	Without stability, after stability, configurable printout	
SBI: Auto. data output:	Without stability, at stability, at user-defined intervals	
SBI: Output format:	16 or 22 characters	
Printout of application data:	Output of a configurable printout	

Analog UniCOM interface (optional)

Level:	4...20 mA, 0...20 mA, 0...5 V
Power supply:	Internal or external
Factory setting:	4...20 mA, internal power supply
Connection:	CAISL3 devices (IP44): 25-pin D-Sub socket CAIS3 devices (IP69K): Connection via screw terminals in the housing, cable routed into the housing via a cable gland.

[1] Optional UniCOM universal data interface
[2] xBPI operating mode: 9600 baud, 8 data bits, parity: odd, 1 stop bit
[3] Network address is valid only in xBPI-RS-485 operating mode

Connection Options

You may need to use an external power supply to operate peripheral devices.

Preparation

See chapter “Getting Started,“ sections “COM1 Pin Assignment Chart, “COM2 Pin Assignment Chart,“ “PS2 Pin Assignment Chart“ for pin assignments and cabling diagrams.

Printer Connection Options

The following printers can be connected to the standard COM1 and COM2 interfaces or the optional UniCOM universal interface:
- YDP20 (user-defined interface parameters)
- YDP14IS (strip or label printer)
- YDP04IS (strip or label printer)
- Universal printer (user-definable transmission parameters)

Device Connection Options

In addition, the following devices can be connected to the standard COM1 and COM2 interfaces:
- Foot / Hand switch, COM1 only
- Second printer
- Remote display
- PC (RS-232 interface)
- Third weighing platform (RS-232 interface)
- External checkweighing display (stop light) via a digital I/O (Sartorius standard), COM1 only
- To PS2: Barcode scanner/External keyboard

The following devices can be connected to the **optional UniCOM** universal interface:
- WP3 RS-232/RS-485
- PC (RS-232 interface)
- Second printer (external power source required)
- Remote display
- Digital I/O
- Current interface (0/4...20 mA), voltage (0...10 V)
- PLC with Profibus DP
- Ethernet

Connection Options for other Weighing Platforms

The Combics 3 model enables you to connect a 2nd or 3rd weighing platform. You can use both the COM1, COM2 or the UniCOM port.
The standard COM1 and COM2 port is operated in RS-232 mode. The following modes are available for a 3rd weighing platform:
- SBI
- IS-232 (factory setting)
- ADC-232

Operating Modes

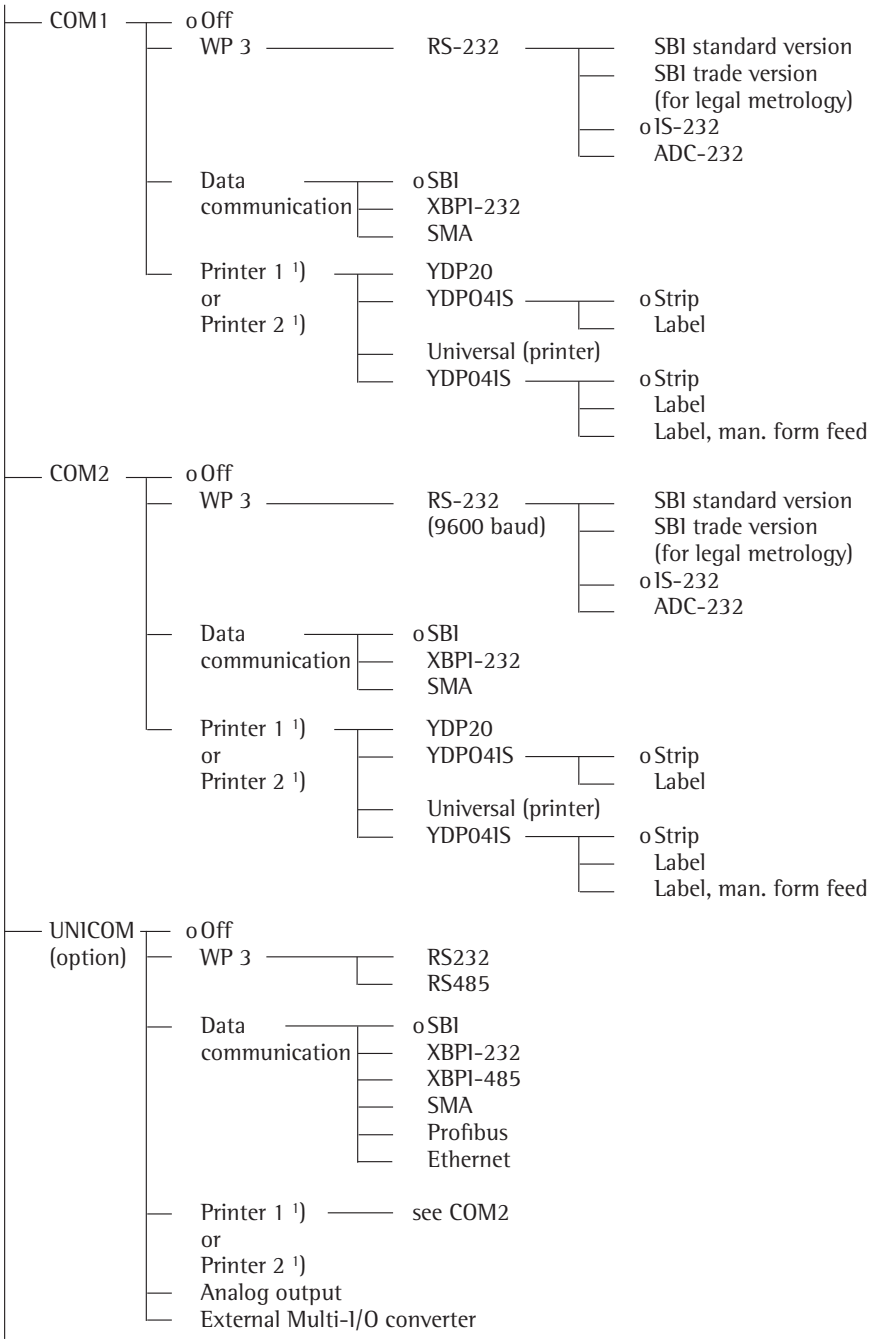
UniCOM interfaces can be operated in either the RS-232 or RS-485 mode.
The third weighing platform can be operated in any of the following modes:
- SBI (RS-232 mode)
- IS-232 (RS-232 mode)
- ADC-232 (RS-232 mode)
- IS-485 (RS-485 mode, xBPI mode, factory setting)
- ADC-485 (RS-485 mode)

The standard COM1 and COM2 ports or the optional universal UniCOM interface can be used as a printer interface.

Configuring the Data Interface as a COM Port

For operation as a COM port, you can adapt data records to the following operating modes:

- SBI (factory setting)
- XBPI-232
- XBPI-485
- SMA



o Factory setting
[1]) Max. 2 printers can be configured

Setting the SBI Data Output

Data output settings can be made in the Setup menu under "Data communications:SBI:Data output."
The following options are available:
- The displayed value, with or without stability check
- Automatic output of the displayed value, either with or without stability check, or automatically at defined intervals
- Output of a printout as configured in the "Device parameters: ConVa. printout:Printer 1" or "Printer 2" (see next page).

You can define the printout content by specifying which blocks of information are to be included (see "Configuring Printouts").
In general, the current display value is output (weight with unit, calculated value, alphanumeric display) unless you configure a user-definable data record.
Generally, data is output only after the weighing instrument has stabilized (factory setting). Here you can define whether data is output on request or automatically, at stability or without stability check; and configure a user-defined printout.
The data output for "without stability" must be set accordingly (SBI: Data output).
If you select time-dependent automatic printout, you need to define the print interval (in display updates) as well.
Each line of a printout can contain up to 20 characters. The first 6 characters, called the "data header", identify the subsequent value. Only 14 characters are available if you disable the header. This is carried out in the "Line format" menu item (see also "Setup Overview" in "Configuration").

Automatic Data Output (SBI)

You can have the weight readout printed automatically[1]). This printout can be generated after a certain number of display updates[2]). You can also configure whether or not the auto-print function is dependent on the stability of the scale[3]). The display update frequency depends on both the scale model and the operating status.
Examples:

`N + 153.00 g`	Net weight
`Stat`	Display blank
`Stat L`	Display underload
`Stat H`	Display overload

„Data output" setting:
1) 3) Automatic, without stability or automatic with stability.
Factory setting: Manual after stability; i.e., automatic data output function off.
2) Time-dependent automatic data output:
Interval: 1, 2, 10 or 100 display updates
Factory setting: 1 display update

Data Input Format

You can connect a computer to your scale to send commands controlling weighing instrument functions and applications via the interface port.
All commands use the same data input format. They begin with the ESC (ASCII: 27) character and end with a carriage return CR (ASCII: 13) and LF (ASCII: 10). The total length of a command is anywhere from 4 characters (1 command character between the start and end described above) to a max. of 7 characters (4 command characters). This number can also be higher when sending texts.
The commands listed in the following table must each be supplemented with ESC ... CR LF.

Example The command character for output is “P“ (“output to Port“). To trigger this command, send the string: “ESC P CR LF”.

Command	Meaning
K	Weighing mode 1
L	Weighing mode 2
M	Weighing mode 3
N	Weighing mode 4
O	Block keys
P	Send display value to data interface
Q	Output acoustic signal
R	Unblock keys
D	Tare and zero (combination tare function)
f3_	Zero (see also the “kZE_” command)
f4_	Tare without zeroing (see also the “kT_” command)
i_	Information about the indicator, example of output: “CAIS3/01-63-09/1“ Meaning: Indicator: Combics 3, software version: 016302, Active weighing platform: 1
kF1_	Trigger soft key F1 function
kF2_	Trigger soft key F2 function
kF3_	Trigger soft key F3 function
kF4_	Trigger soft key F4 function
kF5_	Trigger soft key F5 function
kF6_	Trigger Mem key function
kF7_	Trigger Setup key function
kF8_	Trigger key function
kF9_	Trigger Fn key function
kF10_	Trigger ISO-Test key function
kF11_	Trigger x10 key function
kF12_	Trigger B/G key function
kP_	Trigger key function (print at printer interface)
kT_	Trigger T key (tare)
kNW_	Trigger key function (toggle the weighing platform)
kZE_	Trigger →0← key function (zero the instrument)
kCF_	Trigger CF key function
x1_	Output model designation of active weighing platform, example: “LP6200S-0C“
x2_	Output serial number of active weighing platform, example: “0012345678“
x3_	Output software version of active weighing platform, example: “00-43-04“
x4_	Output software version of indicator, example: “01-63-09“
x9_	Output serial number of indicator, example: “0012345678“
x10_	Output model of indicator, example: “CAIS3“
z1_	Input: printout header 1
z2_	Input: printout header 2

The ASCII code for the “underline” character (“_”) is 95.
Format for entering printout header lines: “ESC z x a ... a _ CR LF“ with x=1 or 2 and a ... a: 1 to 20 characters for header x, followed by the underline, CR and LF characters.

txx...x_ Write text in display. xx...x is the text to be displayed.

Data Output Format

You can output the value displayed in the measured value line and the weight unit, with or without a data ID code. Whether the data ID code is included in the output depends on your settings under “Line Format.“

Examples

```
      +      235 pcs      without ID code
Qnt   +      235 pcs      with ID code
```

“Line Format“ settings: For raw data (16 characters): without header, for other apps. (22 characters): with “header“ (factory setting).

Data Output Format with 16 Characters
Display segments that are not activated are output as spaces.
Values with no decimal point are output without a decimal point.
The type of character that can be output depends on the character's position:
Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
or	–	*	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
or		*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

+-: Signs; the “+“ sign can be hidden under “`Device parameters: COMx:Data communications:SBI:Sign format`.“
*: Space
A: Digit or letter (max. 7 characters plus decimal point)
E: Unit symbol[1] (1 to 3 letters followed by 2-0 spaces)
CR: Carriage return
LF: Line feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF

*: Space
– –: Final readout
H: Overload
HH: Overload in checkweighing
L: Underweight
L L: Underweight in checkweighing
C: Calibration/Adjustment

Error Messages

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	E	r	r	*	*	#	#	*	*	*	*	CR	LF
	*	*	*	E	r	r	*	*	#	#	#	*	*	*	CR	LF

*: Space
#: Number (2 or 3 digit error number)

[1] Based on the model type, e.g. not all units are available for use in legal metrology

Output of the weight value +1255.7 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1: Plus +, or minus - or space
Position 2: Space
Positions 3-10: Weight value with decimal point; leading zeros are output as spaces.
Position 11: Space
Positions 12-14: Characters for unit of measure, space or ! sign as a symbol
Position 15: Carriage return
Position 16: Line feed

Data Output Format with 22 Characters

When data is output with an ID code, the 6-character code precedes the 16-character string described above. These six characters identify the subsequent value.

Normal Operation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
K	K	K	K	K	K	+	A	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
K	K	K	K	K	K	-	A	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

K: ID code character, right-justified with spaces
+-: Plus or minus sign
*: Space
A: Digit or letter (max. 7 characters plus decimal point)
E: Measurement unit symbol1) (1 to 3 letters followed by 2-0 spaces)
CR: Carriage return
LF: Line feed

Special Codes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	*	*	*	C	*	*	*	*	*	*	*	CR	LF

*: Space
– –: Final readout
H: Overload
HH: Overload in checkweighing
L: Underweight
L L: Underweight in checkweighing
C: Calibration/Adjustment

[1]) Based on the model type, e.g. not all units are available for use in legal metrology

Error Message

12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
St	a	t	*	*	*	*	*	S	r	r	*	*	#	#	*	*	*	*	CR	LF
St	a	t	*	*	*	*	*	S	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space
#: Number (2 or 3 digit error number)

G#	Gross value
N	Net value
T	Application tare memory 1
T2	Application tare memory 2
Diff	Difference from calibration value
Targ.	Exact adjustment weight value
Nom.	Exact calibration weight for SBI protocol output
nRef	Reference sample quantity
pRef	Percentage of reference
wRef	Reference piece weight
Qnt	Result from Counting application Result from Counting (piece count) and Neutral Measurement applications
mDef	Target value for animal weighing
x-Net	Animal weighing results
Setp	Target value for checkweighing
Diff.W	Absolute difference (e. g., in kg) in Checkweighing
Lim	Deviation in % in Checkweighing
Max	Upper tolerance for checkw.
Min	Min. tolerance for checkw.

Stat	Status
Classx	Classification, class x
Limx	Class limit
D	Percentage (as loss)
Prc	Percentage (as residue)
Wxx%	Reference percentage weight
Cmpxxx	Component xxx
Cont.T	Contents of the tare memory in Net-total Formulation
S-Comp	Total of initial weighings for Net-total Formulation
PT2	Preset tare
n	Transaction counter
*G	Sum of gross weights in Totalizing
*N	Sum of net weights in Totalizing
Ser.no	Serial number of the platform or indicato

Example:
Output of the weight value +1255.7 g

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
G	#	*	*	*	*	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1-6: ID code, right-justified with spaces
Position 7: Plus +, or minus - or space
Position 8: Space
Positions 9-16: Weight value with decimal point; leading zeros are output as spaces (a comma can also be set instead of a decimal point).
Position 17: Space
Positions 18-20: Characters for unit of measure, space or **!** sign as a symbol
Position 21: Carriage return
Position 22: Line feed

If the weight value is output with 10-fold increased resolution, this value is not permitted to be printed or saved in a weighing instrument operated in legal metrology in the SBI mode. In this case, the unit symbol is not included with output.

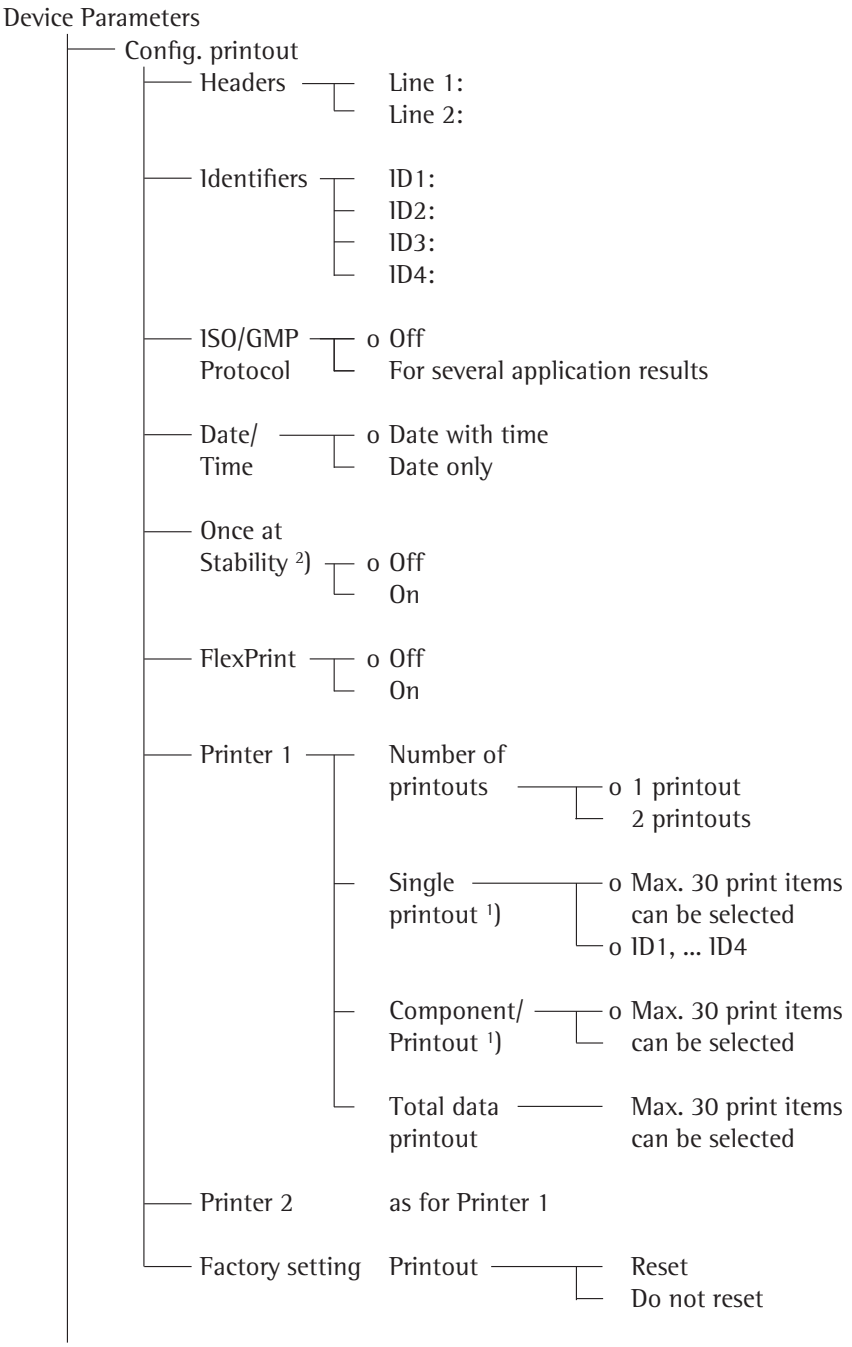
External Keyboard Functions (PC Keyboard)

For settings, go to the Setup menu under "`Device parameters: Bar code:External keyboard`."
The alphanumeric key codes implemented here are specific to the German keyboard layout. The following alphanumeric characters are used (some require the "Shift" key):
a - z, A - Z, 0 - 9, <space>, and these characters: ,.\+'<>/»$@%/();=:_?*

Function keys:

PC keyboard	**Combics 3**
F1	→T← key
F2	→0← key
F3	△▽ key
F4	F5 soft key (far left)
F5	F4 soft key (second from left)
F6	F3 soft key (middle)
F7	F2 soft key (second from right)
F8	F1 soft key (far right)
F9	⏲ key
F10	⏲ key - long (info function)
F11	Setup key
F12	Fn key
Print	⎙ key
Return	F1 soft key (far right)
Cursor up	F3 soft key (middle)
Cursor left	F4 soft key (second from left)
Cursor down	F2 soft key (second from right)
Cursor right	F1 soft key (far right)
Pos 1	CF Fn I/⏻ ∨
Backspace	CF key
ESC	CF key

Configuring the Data Interface as a Printer Port



o Factory setting
1) Multiple selections possible
2) When the minimum load is exceeded (can be set under menu item: "Application parameters: ... : Min. load for autom. taring")

There are several actions that generate the command for outputting data to the printer port:

- Pressing the (F) key.
  If the operating menu is active, all menu settings under the active menu level are printed.
- In some applications, pressing a given key (e. g., to save a value or start a routine) also generates a print command, or it is generated automatically depending on the application configuration. In this case, a configurable printout is generated with application-specific data.

The ⊙ and ◈ symbols are displayed when data is being output to the printer port.

Configuring a Printout

A printout can be configured in the Setup menu under "**Device parameters:ConVg. printout.**" This should be carried out **after** configuring the application since some data in the printout is application-dependent.
You can configure a separate printout for each interface. Each printout is comprised of different information blocks that can be activated or deactivated via multiple selection in the menu.
For the "Totalizing" and "Net-total Formulation" applications, the totalizing/results printout can be configured independent of the individual/component printout.
The individual information blocks are shown below with detailed explanations.
Samples of complete printouts are provided following the end of this section.

Headers

2 headers each with a max. of 20 characters are available (e. g. for printing the company name).
Print image example:

```
ACE HARDWARE
 GOETTINGEN
```

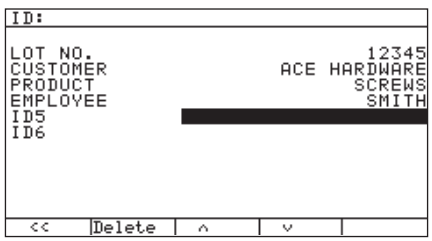
Date/Time

Print image example: `21.01.2010  16:02`

To maintain a uniform time (e. g. for documentation within a complete automatic system), the printing of the time can be suppressed in "**Device parameters:ConVg. printout:Date/time.**" When you set "**Date only.**" the time can be added, e. g. from a superordinate control in order to always have the same time throughout the system. This setting is mainly designed for communication with a PC.

Identifiers

Use the "**ID**" soft key to enter text in the named IDs via the keypad.



Application Initialization Data

Which data is included in this block depends on the active application. In the "Counting" application, for example, the reference sample quantity and reference weight are printed (plus a blank line).

```
nRef          10 pcs
wRef  +    0.035 kg
```

"Counting" print block example:

Scale Identification

```
Ser.no.   1234567890
```

Print image example for weighing platform serial number:

Scale Identification

This content is application-dependent. If provided in the application, the gross, net and tare weights are usually printed, followed by a blank line. This block is terminated by a dotted line.

```
 G#    +    1.402 kg
 T     +    0.200 kg
 N     +    1.202 kg

Qnt           34 pcs
--------------------
```

"Counting" application print image example:

GMP-compliant printouts

When this function, the printout is supplemented with a GMP header and a GMP footer (GMP: "Good Manufacturing Practice").
If the GMP-compliant printout is activated, the 🖹 symbol remains displayed until the GMP footer is printed.
Setting: Setup menu under "`Device parameters:ConVg. printout:ISO/GLP/GMP- printout`."

You can choose from the following settings:
- GMP-compliant printout off (factory setting)
- GMP-compliant printout for multiple application results

The GMP header is included from the first printout generated subsequent to the activation of the GMP printout.
The GMP footer is printed after several measurement results by pressing and holding the p key, e.g. for component printing (menu item "For multiple application results"). In this case, the T symbol remains visible until the GMP footer is printed.
If you toggle to a different platform while a GMP printout of several measured results is being generated, the GMP footer for the platform used up to that point is generated when you press the n key. The GMP header for the other platform is included on the next printout generated.
A GMP-compliant printout is generated automatically at the conclusion of calibration/adjustment and linearization routines, as well as when you set or delete a preload.
If you use a label printer for GMP-compliant printouts, you may find that a single label is not long enough for the data printed. If this is the case, you can activate the automatic form feed after each printout of a GMP header and measurement results.
The following provides sample GMP headers and footers (see "Sample Printouts").

Sample Printouts

For details on the individual information blocks, see “Configuring Printouts.”
For details on configuring the header lines, refer to the chapter of the respective application.

“Weighing” Application

The “Application initialization data“ information block is empty.
If selected, an empty line will be printed.

```
     HEADER LINE1
     HEADER LINE2
14.01.2010     09:43
--------------------

Ser.no.     80705337

G#    +    1.402 kg
T     +    0.200 kg
N     +    1.202 kg
--------------------

--------------------
```

Display with ID and weighing platform:

```
Ser.no.     80705337

G#    +    1.402 kg
T     +    0.200 kg
N     +    1.202 kg
--------------------
```

“Counting” Application

The initialization data block contains the reference sample quantity and the reference sample weight.

```
--------------------
nRef          10 pcs
wRef  +    0.035 kg

G#    +    1.402 kg
T     +    0.212 kg
N     +    1.190 kg

Qnt           34 pcs
--------------------
```

The results block contains gross, net and tare weight

and the piece count as a result.

"Neutral Measurement" Application

The initialization data block contains the reference sample quantity and reference weight.

```
--------------------
Ref           2 o
wRef  +    1.200 kg
```

```
G#    +   14.700 kg
T     +    0.300 kg
N     +   14.400 kg
```

The results block contains gross, net and tare weight

```
Qnt           12 o
--------------------
```

and the piece count as a result.

"Weighing in Percent" Application

The initialization data block contains the reference percentage and reference weight.

```
--------------------
pRef         100 %
Wxx%  +    2.100 kg
```

Percentage = residual

```
G#    +    1.859 kg
T     +    0.200 kg
N     +    1.659 kg
```

The results block contains gross, net and tare weights, as well as the percentage, which is shown as either the loss or the residual amount.

```
Prc           79 %
--------------------
```

and the piece count as a result.

```
--------------------
pRef         100 %
Wxx%  +    2.100 kg
```

Percentage = loss

```
G#    +    0.641 kg
T     +    0.200 kg
N     +    0.441 kg
```

The results block contains gross, net and tare weight

```
D             21 %
--------------------
```

and the piece count as a result.

"Checkweighing" Application

The initialization data block contains the target weight, the minimum and maximum load. The results block always contains the gross, net and tare weight. Additional results can be printed in 2 different display types: and the piece count as a result.

- Weight display:
  In the OK and nonconforming range, the deviation from the target weight is always printed as a percentage and absolute deviation.

- Relation to target value:
  In the OK range, the deviation from the target weight is printed as a percentage and absolute deviation. In the nonconforming range, "HH" is printed for exceeding the weight and "LL" for falling below the weight.
  OK range in the weight and tolerance limit display

Nonconforming range in the weight display

```
--------------------
Setp  +    1.300 kg
Min   +    1.235 kg
Max   +    1.365 kg

G#    +    1.312 kg
T     +    0.000 kg
N     +    1.312 kg

Lim   +    0.92 %
Diff.W+    0.012 kg
--------------------
```

Result outside (over) "OK" range; "Threshold" printout:

```
--------------------
Setp   +    1.300 kg
Min    +    1.235 kg
Max    +    1.365 kg

G#     +    1.400 kg
T      +    0.000 kg
N      +    1.400 kg

Stat     HH
--------------------
```

Component printout, example with 2 transactions:

```
     HEADER LINE1
     HEADER LINE2

14.01.2010     09:43
--------------------
G#    +    1.400 kg
T     +    0.200 kg
N     +    1.200 kg
n             1

G#    +    3.400 kg
T     +    0.200 kg
N     +    3.200 kg
n             2
```

Examples: print 2nd transaction
Individual printout

```
     HEADER LINE1
     HEADER LINE2
```

Complete standard printout configuration is printed for each transaction.

```
14.01.2010     09:43
--------------------
G#    +    2.400 kg
T     +    0.200 kg
N     +    2.200 kg
n             2
```

```
G#    +    2.400 kg
T     +    0.200 kg
N     +    2.200 kg
```

Standardausdruck
The transaction counter is not printed.

```
--------------------
MENU
      SETUP
WP1
--------------------
  1
   1.1
            1.1.2
            1.2.1
1.3.2
...
  1.18
   1.18.1
    CAL.
        10.000 kg
etc.
```

Print menu parameters:
All active sub-items of the currently displayed menu are printed.

GMP-compliant printouts

"Linearization" printout

```
--------------------
14.07.2010     13:00
Type            CAIS2
Ser.no.      12345678
Vers.     1.02.101110
BVers.       01-63-01
--------------------
```

Linearization

```
Wt.1 +       7.00 kg
Wt.2 +      15.00 kg
Wt.3 +      22.00 kg
Wt.4 +      30.00 kg
            completed
--------------------
14.07.2010     13:02
Name:

--------------------
```

Calibration/adjustment printout

```
--------------------
14.07.2010     13:50
Type            CAIS2
Ser.no.      12345678
Vers.     1.02.101110
BVers.       01-63-01
--------------------

External calibration
Targ. +     30.00 kg
Diff. -      0.03 kg
External adjustment
Diff. +      0.00 kg
--------------------
14.07.2010     13:52
Name:

--------------------
```

Setting the preload printout

```
--------------------
14.07.2010     13:50
Type            CAIS2
Ser.no.      12345678
Vers.     1.02.101110
BVers.       01-63-01
--------------------
Set preload
            completed
--------------------
14.07.2010     13:52
Name:
--------------------
```

Deleting the preload printout

```
--------------------
14.07.2010     13:50
Type            CAIS3
Ser.no.      12345678
Vers.     1.02.101110
BVers.       01-63-01
--------------------
Delete preload
           completed
--------------------
14.07.2010     13:52
Name:

--------------------
```

Weighing printout with multiple results (example: 2 results):

```
--------------------
14.07.2010     09:43
Type            CAIS3
Ser.no.      12345678
Vers.     1.02.101110
BVers.       01-63-01
--------------------

     HEADER LINE1
     HEADER LINE2
14.07.2010     09:43
--------------------
G#    +      2.40 kg
T     +      0.20 kg
N     +      2.20 kg
--------------------
     HEADER LINE1
     HEADER LINE2
14.07.2010     09:44
--------------------
G#    +      3.40 kg
T     +      0.30 kg
N     +      3.10 kg
--------------------
14.07.2010     09:45
Name:

--------------------
```

Error Codes

Errors are divided into the following:

- Fatal and dynamic errors are displayed for the duration of the error via the "ERR" error code.
- Temporary errors are displayed for 2 seconds via the "INF" error code; then the program automatically switches back to normal weighing operation.

Display	Cause	Solution
No display elements	No power present	Check power supply
-------	Key has no function in this status	
Flashing ⚠	Battery defective or time changed	Set time
H	Load exceeds weighing capacity	Unload the scale
L or ERR 54	Weighing pan is not in place	Position the weighing pan
ERR 101 - 104 key pressed when switching on the device	Key is stuck Contact your local Sartorius Service Center	Release key or
ERR 320	Operating program memory faulty	Contact your local Sartorius Service Center
ERR 335	Verified weighing platform not compatible with the connected terminal	Connect a compatible weighing platform
ERR 340 ,	Incorrect operating parameter (EEPROM)	Turn the scale off and then on again. If the error code Err340 is still displayed please contact your local Sartorius Service Center
ERR 341	RAM has lost data Battery is empty	Connect the device to power for at least 10 hours
ERR 343	Loss of data in the memory area for transaction numbers in external alibi memory	Contact your local Sartorius Service Center
INF 01 "Display overload"	Data output not compatible with output format	Set output format correctly
INF 02 "Zero point error key at start of cal."	Adjustment condition was not maintained, e.g. not tared or weighing pan loaded	Unload the scale first then zero, then tare via the →T←
INF 03	Adjustment could not be completed within a certain time.	Allow to warm up again and repeat the adjustment process
INF 06 "Int. weight not available or missing"	Built-in adjustment weight is defective	Contact your local Sartorius Service Center
INF 07 "Function not allowed for veriVable weighing"	Function not allowed in scales verified for use in legal metrology	Contact your local Sartorius Service Center for information on changing settings
INF 08	The load on the scale is too heavy to zero the readout	Check whether "Tare/zero at power on" was complied with in your configuration.
INF 09	Taring is not possible when the scale gross weight is < zero	Zero the scale
INF 10	Tare key is blocked when there is data in the tare memory	The data stored for the application program must be . deleted before taring
INF 22	Error in storing reference value	Load is too light, place a heavier weight on the weigher
INF 23 "Application initialization error"	Error in initializing an application	Contact your local Sartorius Service Center
INF 29 "Scale minimum load not reached"	Minimum load not reached	Reduce minimum load (in the "Application parameters," under "Minimum load for autom. initialization")
INF 71 "Invalid value," Value too low/high" or "selection is not possible"	Cannot store the current weight value (e.g., control limits too low or too high)	None
INF 72 "Maximum quantity reached"	Cannot store the current weight value (e.g. transaction counter maximum reached)	None
INF 73 "Memory deleted/ Memory not available"	Data not found or unreadable	Contact your local Sartorius Service Center
INF 74 "Function is not available" or "Function is blocked"	Function is blocked (e.g. menu is blocked)	None
INF 88 "Function was started"	A function has been activated	None
INF 98	No weighing platform connected	Connect a weighing platform
INF 99	No weighing platform connected	Connect a weighing platform
NO WP	No weighing platform connected	Connect a weighing platform

Care and Maintenance

Service

Regular servicing by a Sartorius technician will extend the service life of your device and ensure its continued weighing accuracy. Sartorius offers its customers service contracts with regular maintenance intervals ranging from one month to two years. The frequency of the maintenance intervals depends on the operating conditions and the operator's tolerance requirements.

Repairs

Disconnect the power supply to the defective equipment immediately (unplug the power cord from the mains supply). Repair work must be performed by authorized Sartorius service technicians using original spare parts. Repairs performed by untrained persons may result in considerable hazards for the user.

If a cable or cable gland is damaged or defective, replace the cable as a complete unit with all its connectors.

Do not open the indicator while it is carrying current. Wait at least 10 seconds after disconnecting it from power before beginning to open the equipment. Proper fitting of all surfaces is essential for the IP rating of the housing; for this reason the device must be opened and closed by a certified technician.

Cleaning

Disconnect the power supply to the scale before cleaning (unplug the power cord from the mains supply).

Cleaning the interior of the weighing platform (CAW.. models only)

- ▶ Remove the load plate. Special care is required for models larger than 1000 x 1000 mm.
- ▶ Use compressed air to clean out the interior or use a weak water jet (max. 60°C).

Take special care that no dirt gets into the gap of the overload protection (gap between the load sensor and screw-on plate).

Corrosive Environment

- ▶ Remove all traces of corrosive substances from the device on a regular basis.

Cleaning the Indicator

Disconnect the power supply to the indicator (unplug the power cord from the mains supply). If necessary, disconnect the data cable.

Make sure that no liquid enters the indicator.

Do not use aggressive cleaning agents (solvents or similar agents).

Do not spray the device with water or blow with compressed air.

Indicators are designed in compliance with European Hygienic Equipment Design Group (EHEDG) directives on suitable measures to avoid contamination, so that they are particularly easy to clean and disinfect.

- ▶ Clean the indicator with a cloth lightly moistened with a soap solution. For use in the food industry, use a cleaning agent suitable for that particular working environment.
- ▶ Wipe the indicator with a soft, dry cloth.

Cleaning stainless steel surfaces

- Only use conventional household cleaning agents which are suitable for stainless steel.
- Only use solvents for cleaning stainless steel parts.

- ▶ All stainless steel parts should be cleaned at regular intervals: Rub stainless steel surfaces with a moist cloth, with a cleaning agent if required, then remove all residue from the surface.
- ▶ Allow device to dry. For additional protection, protective oil may be applied.

Replacing the dust cover

A damaged dust cover should be replaced immediately.

- ▶ Remove damaged dust cover.
- ▶ Place the new dust cover on the display and control unit and press it over the edge of the front and rear side of the device until it is fixed in place.

Safety Inspection

Safe operation of the device is no longer ensured when:

- The device or the mains connecting lead shows visible damage.
- The integrated power supply for the indicator no longer functions properly.
- The device has been stored for a relatively long period under unfavorable conditions (e.g., excessive humidity)

If there is any indication that safe operation of the device is no longer warranted:

- ▶ Disconnect the power supply to the device (unplug the power cord from the mains supply) and make sure the device cannot be used for the time being.
- ▶ Notify your nearest Sartorius Service Center.

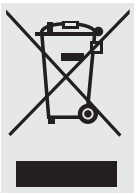
Maintenance and repair work may only be carried out by service technicians:
- Who have access to the required maintenance documents and manuals

and
- Who have attended the appropriate training workshops

The seals on the device indicate that the device may only be opened and maintained by authorized specialist personnel, so that the correct and safe operation of the device is ensured and the guarantee remains valid.

Disposal

If the packaging is no longer needed, it can be disposed of by local waste disposal authorities. The packaging is made of environmentally friendly materials that can be used as secondary raw materials.



The equipment, including accessories and batteries, should not be disposed of as regular household waste. EU legislation requires its Member States to collect electrical and electronic equipment and dispose of it separately from other unsorted municipal waste so that it may be recycled.

In Germany and many other countries, Sartorius takes care of the return and legally compliant disposal of its electrical and electronic equipment. These products may not be placed with household waste or brought to collection centers run by local public disposal operations – not even by small commercial operators. For disposal in Germany and in the other member nations of the European Economic Area (EEA), please contact our local service technicians or our Service Center in Goettingen, Germany:

Sartorius Weighing Technology GmbH
Weender Landstrasse 94-108
37075 Goettingen, Germany

SWT GÖ: WEEE-Reg.-Nr. DE 49923090

In countries that are not members of the European Economic Area (EEA) or where no Sartorius subsidiaries or dealerships are located, please contact your local authorities or a commercial disposal operator.

Prior to disposal and/or scrapping of the equipment, any batteries should be removed and disposed of in local collection boxes.

Sartorius will not take back equipment contaminated with hazardous materials (ABC contamination) either for repair or disposal. Please refer to our website (www.sartorius-mechatronics.com) or contact the Sartorius Service Department for more detailed information regarding repair service addresses or the disposal of your device.

Specifications

General Specifications
CAW* P | S

Maximum readability	31,250 (option A8)/100,000 (option A20) digits (not in legal metrology)
Accuracy class	(III), (IIII)
Verification scale intervals Option A8	≤3125e “Single-range mode“ or ≤3125e “Multi-interval mode“ or 2x≤3125e “Multiple-range mode“ according to EN 45501
Verification scale intervals Option A20	≤100,000e “Single-range mode“ or ≤3125e “Multi-interval mode“ or 2x≤3125e “Multiple-range mode“ according to EN 45501
Digital protective interface	According to EN45501
Data interface	Bidirectional RS-232C with control outputs (5 V, TTL standard), built-in as standard
Additional data interface	Optional
Display	20 mm weight value, 7-digit plus status symbols, backlit
Housing: Material Dust and water protection acc. to EN60529	 AISI 304 stainless steel (1.4301) CAW3P, CAW3P: IP44 (optional IP65) CAW3S: IP67/69K CAH3E: IP65 protection, CAH3G: IP67 protection
Temperature range	–10°C to +40°C
Power supply DC power supply AC power supply	100–240 VAC (–15/+10 %), 50–60 Hz, max. 17 W/23 VA optional 15.5–24 VDC (±10%), max. 12 W optional 13–17 VAC (±10%), 50–60 Hz, max. 12 W
Limitation of emissions	According to EN61326-1 Class B (IEC 61326-1)
Defined immunity to interference	According. to EN61326-1, industrial areas (IEC61326-1)
Electrical safety	Acc. to EN61010-1 (IEC 1010-1), EN60950 (IEC 950)

Model-specific Data

Model type:	**CAW*P...-L**	**CAW*P...-I**	**CAW*P...-BCE**	**CAW*P....-NCE (2 x 3000e)**			
	Readability	**Readability**	**Readability**	**Weighing range 1**		**Weighing range 2**	
Weighing capacity	**15000d**	**30000d**	**1x3000e**	**Maximum capacity**	**Readability**	**Maximum capacity**	**Readability**
3 kg	0.2 g	0.1 g	1 g	1.5 kg	0.5 g	3 kg	1 g
6 kg	0.5 g	0.2 g	2 g	3 kg	1 g	6 kg	2 g
15 kg	1 g	0.5 g	5 g	6 kg	2 g	15 kg	5 g
30 kg	2 g	1 g	10 g	15 kg	5 g	30 kg	10 g
60 kg	5 g	2 g	20 g	30 kg	10 g	60 kg	20 g
150 kg	10 g	5 g	50 g	60 kg	20 g	150 kg	50 g
300 kg	20 g	10 g	100 g	150 kg	50 g	300 kg	100 g
600 kg	50 g	20 g	200 g	300 kg	100 g	600 kg	200 g
1500 kg	100 g	50 g	500 g	600 kg	200 g	1500 kg	500 g
3000 kg	200 g	100 g	1000 g	1500 kg	500 g	3000 kg	1000 g

CAW*S... Model Resolutions

Resolution 1 weighing range				Resolution* 2 weighing ranges			
CAW*S...	-L	-I	-BCE	-NCE			
Weighing range	15,000d	30,000 d	1 x 3000e	Weighing range 1	Resolution	Weighing range 2	Resolution Range 2
in kg	in g	in g	in g	in kg	in g	in kg	in g
3	0.2	0.1	1	1.5	0.5	3	1
6	0.5	0.2	2	3	1	6	2
15	1	0.5	5	6	2	15	5
30	2	1	10	15	5	30	10
60	5	2	20	30	10	60	20
150	10	5	50	60	20	150	50
300	20	10	100	150	50	300	100
600	50	20	200	300	100	600	200
1500	100	50	500	600	200	1500	500
3000	200	100	1000	1500	500	3000	1000

2 x 3000e[1])				**3 x 3000e**[1])[2])						**6000e**[1])[2])	
Multi Intervall **-MCE**				Multi Range **-UCE**						**-RCE**	
Weighing range 1 in kg	Resolution range 1 in g	Weighing range 2 in kg	Resolution range 2 in g	Weighing range 1 in kg	Resolution range 1 in g	Weighing range 2 in kg	Resolution range 2 in g	Weighing range 3 in kg	Resolution range 3 in g	Weighing range in kg	Resolu-tion in g
1.5	0.5	3	1	–	–	–	–	–	–	–	–
3	1	6	2	1.5	0.5	3	1	6	2	–	–
–	–	–	–	3	1	6	2	15	5	–	–
15	5	30	10	6	2	15	5	30	10	–	–
30	10	60	20	15	5	30	10	60	20	60	10
60	20	150	50	30	10	60	20	150	50	120	20
150	50	300	100	60	20	150	50	300	100	300	50
300	100	600	200	150	50	300	100	600	200	600	100
600	200	1500	500	300	100	600	200	1500	600	1200	200
1500	500	3000	1000	600	200	1500	500	3000	1000	3000	500

* The weighing ranges permitted for use in legal metrology are listed in the Declaration of Conformity. The respective weighing range cannot be shifted for devices with two weighing ranges (2x 3000e). If a higher weighing range is used for weighing, then the lower resolution remains after taring.

[1]) IP69K not for all CAW*S4 models (see data sheet)
[2]) Depending on the model type (see data sheet)

Resolution (depending on the readability)

- L 15,000 d, intervals
- I 30,000 d, intervals
- BCE 1 + 3,000 e, verifiable intervals
- NCE 2 + 3,000 e, verifiable intervals, multi-range, fixed fine range
- MCE 2 + 3,000 e, verifiable intervals, multi-interval, adjustable fine range
- UCE 3 + 3,000 e, verifiable intervals, multi-range, fixed fine range
- RCE 1 + 6,000 e, verifiable intervals

Reference device

Description	Weighing capacity (kg)	Readability e=(g), d=(g)	Verification scale interval Accuracy class	Min. load (g)	Dimensions (mm)
CAH3E					
-16ED-H	16	0,1	–	–	400 × 300 × 120
-16ED-HCE	16	0,1	1	5	400 × 300 × 120
-34ED-H	34	0,1	–	–	400 × 300 × 120
-34ED-HCE	34	0,1	1	5	400 × 300 × 120
-64ED-S	64	1	–	–	400 × 300 × 120
-64ED-SCE*	64	1	10	50	400 × 300 × 120
-64ED-H	64	0,1	–	–	400 × 300 × 120
CAH3G					
-64FE-S	64	1	–	–	560 × 450 × 95
-64FE-HCE*	64	1	10	50	560 × 450 × 95
-150IG-H	150	1	–	–	800 × 600 × 117
-150IG-HCE*	150	1	10	50	800 × 600 × 117
-300IG-H	300	2	–	–	800 × 600 × 117
-300IG-HCE*	300	20	20	1000	800 × 600 × 117

* = Only kg as weight unit

Type designation Combics high resolution complete scales

CAH3E

Application	Base frame design of platform	Weighing range	Platform dimensions	Resolution	Resolution verifiable versions
CAH3	E	-16	ED	-H	-HCE
	E	-34	ED	-H	-HCE
	E	-64	ED	-S	-SCE

Order code E: = Base frame epoxy resin coated

CAH3G

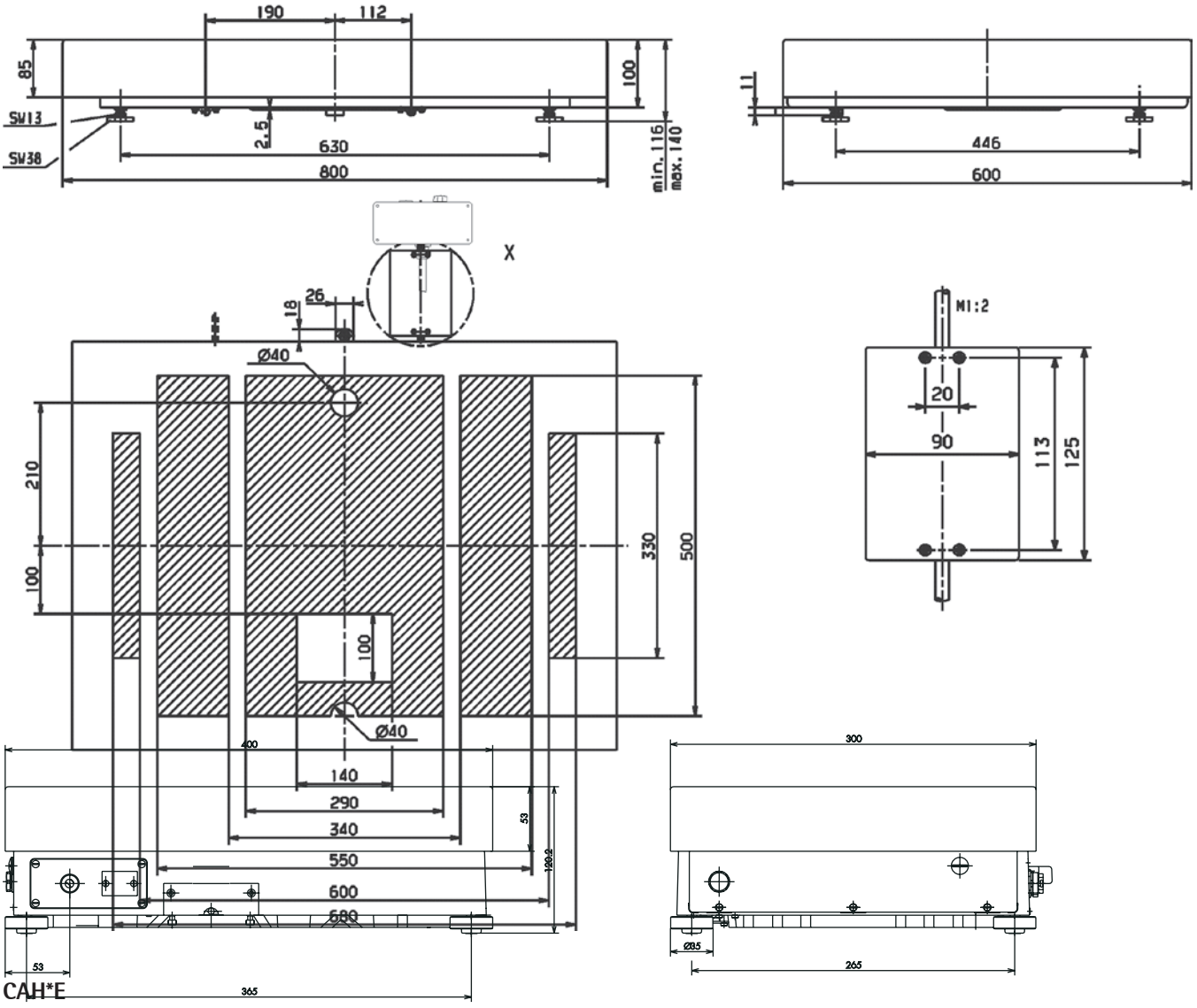
Application	Base frame design of platform	Weighing range	Platform dimensions	Resolution	Resolution verifiable versions
CAH3	G	-64	FE	-S	-SCE
	G	-150	IG	-H	-HCE
	G	-300	IG	-H	-HCE

Order code G = base frame galvanized

Device Dimensions

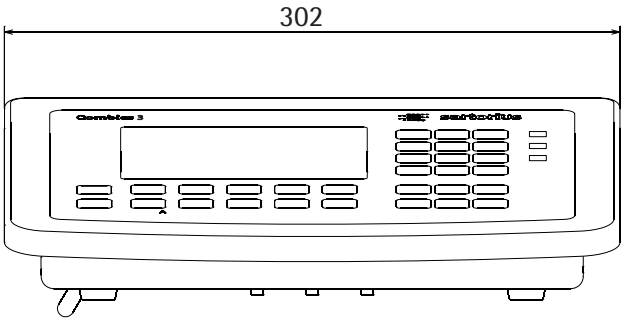
Dimensions of CAH platforms (Scale Drawings)
All dimensions are given in millimeters

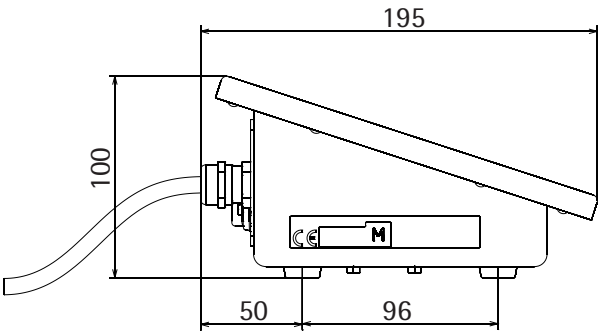
CAH*G

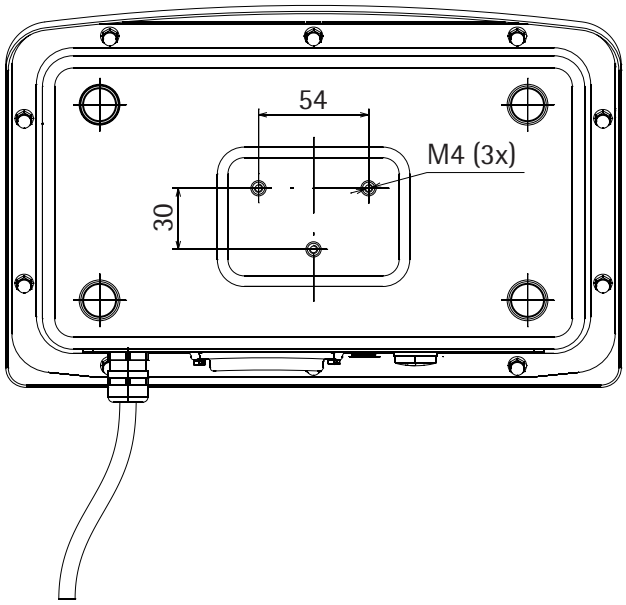


CAH*E

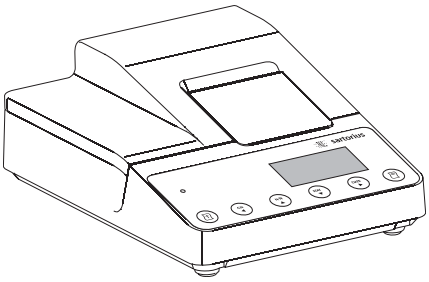
Dimensions of indicator (Scale Drawings)
All dimensions are given in millimeters







Accessories

	Product	Order No.
	Verifiable printer with functions for date, time and statistical evaluations and LC display.	YDP20-0CE
	– 5x 50 m paper rolls for data printer	6906937
	– Replacement ink ribbon cartridge for printer	6906918
	Verifiable strip and label printer with barcode printout, paper width 108 mm, with adapter cable (12-pin round male connector) and external power supply.	YDP14IS-0CEUV
	Verifiable strip and label printer with barcode printout, paper width 60 mm, with adapter cable (12-pin round male connector) and external power supply.	YDP04IS-0CEUV
	– Adapter cable for CAISL indicator	YCC01-01CISLM3
	– Adapter cable for CAIS indicator	YCC02-R12F6
	Verifiable strip and label printer with thermal print head, paper width 60 mm, with adapter cable (12-pin round male connector) and external power supply.	YDP14S-0CEUVTH
	– Adapter cable for CAISL indicator	YCC01-01CISLM3
	– Adapter cable for CAIS indicator	YCC02-R12F6
	– Ink ribbon for YDP14IS-0CEUVTH	69Y03234
	– 3 paper rolls for YDP04IS, 60 mm×75 m, thermal paper	69Y03090
	– Labels, small, 58 mm×30 mm, 1000 labels	69Y03092
	– Labels, medium, 58 mm×76 mm, 500 labels	69Y03093
	– Labels, large, 58 mm×100 mm, 350 labels	69Y03094

UniCOM interface:	**CAW1P**	**CAW2P, CAW3P**	**CAW1/2/3S, CAH1/3**	
Installation options:	For installation in IP44 version	For installation in IP44 version	For installation in IP69K version	
Interface module (RS-232)	–	•	•	YDO02C-232
Interface module (RS-422 and RS-485) galvanically isolated	–	•	•	YDO02C-485
Electrically isolated digital I/Os, 5 outputs and 5 inputs, freely configurable	–	•	•	YDO02C-DIO
Analog current output, 0 – 20 mA, 4 – 20 mA, 0 – 10 V, 16 bit [1])		–	•	• YDO02C-AO
Profibus DP interface module [1])	–	–	•	YDO02C-DP
Ethernet interface module	–	–	•	YDO02C-ETH

[1]) Suitable for use in zones 2 + 22

Product	Order No.
Replacement 1st weighing point/scale connection instead of internal A/D converter (3000e)	
Analog platform 10,000e	YDI02C-WPA
RS-232 interface for digital platform	YDI02C-WPD
RS-485 interface for digital platform	YDI02C-WPD
2nd weighing point/Scale connection	
Analog platform 10,000e	YDI02C-WPA
RS-232 interface for digital platform	YDI02C-WPD
RS-485 interface for digital platform	YDI02C-WPD
External interface adapter	
Connection cable from RS-232 data interface to USB interface on the PC, D-SUB plug 25-pin, 2 m[1])	YCC01-USBM2
Digital input/output module to connect Combics 2 to external control units, with 8 open collector outputs (50 mA) and 7 TTL-compatible inputs (0 – 30 V), YCC02-RELAIS01/02 connection cable required	YSB02
Relay box to connect Combics 2 to external control units, YCC02-RELAIS01/02 connection cable required	VF3033
Software	
Sartorius Nice Label Express (SNLE)	YAD02IS
WinScale for Windows	YSW03
SartoCollect	YSC02
Other Functions	
Guard covers (x2)	YDC01CI
IP65 kit for cable connections (D-SUB 25)	on request
Cable gland for cables with diameter 4.5 to 9 mm, M16 x 1.5	YAS04CIS
Kit for control panel installation[2])	YAS07CI
Plug and socket set to connect analog weighing platforms to indicators (separable connection)	YAS99I
Stainless steel cable connection box for connecting up to 4 load cells in one platform or for external assembly, PR6130/64S	940536130642
Relay box to connect weighing instruments to external controls, with 4 (5) relay outputs (250 V/3 A) and 1 optocoupler input (0 – 30 V)	YSB01
Peripheral devices	
Control display red/green/red	YRD14Z
Remote display for Combics CAW3P indicators	YRD02Z
Remote display, 7-segment, up to 45 mm character size	on request
Barcode scanner, 120 mm scanning width, with cable for connection to CAISL2	YBR03PS2
Foot switch, incl. D-Sub 25-pin T-connector	YFS01
Hand switch, incl. D-Sub 25-pin T-connector	YHS02
Flow control for pumps with analog or pulse interface	YFC02Z-V2
Flexible formatting options for printouts (e. g., barcodes, variable font sizes, graphics, etc.)	on request

[1]) CAW3P models only
[2]) Suitable for use in zones 2 + 22

Product	Order No.
Mechanical accessories	
Brackets for wall mounting, stainless steel	YDH02CIS
Floor-mounted column	YDH03CIP
Floor-mounted column, stainless steel	YDH03CIS
Base for installing floor-mounted column	YBP03CIP
Base for installing floor-mounted column, stainless steel	YBP03CIS
Mount for barcode scanner, to be attached to: floor-mounted column, bench stand, complete scale retainer	YBH01CWS
Plate for attaching a printer to the floor-mounted column or bench stand	YPP01CWS
Castor set (2 guide castors, 2 lockable castors) for YBP03CIP/S floor-column base	YRO03CI
Plug and socket set to connect analog weighing platforms to indicators (separable connection)	YAS99I
Electrical requirements	
24 V industrial power supply module[1])	on request
Connection cable for CAW*S (IP 69K)	
Connection cable with cable gland, open cable ends on Combics side	
- for barcode scanner YBR03FC, 5-pin DIN socket, 1 m	YCC02-BR02
- for printer YDP12/04IS, 9-pin D-SUB plug, 6 m	YCC02-D09M6
- for printer YDP20-0CE or PC, 9-pin D-SUB socket, 6 m	YCC02-D09F6
- for Sartorius scales, 25-pin D-SUB plug, 6 m	YCC02-D25M6
- for various accessories, 25-pin D-SUB socket, 6 m	YCC02-D25F6
- for Sartorius scales, 12-pin round plug, 6 m	YCC02-R12M6
- for various accessories and IS platforms, 12-pin round plug socket, 6 m YCC02-R12F6	
- open cable ends, 6 m	YCC02-RELAIS02
Ethernet connection cable with cable gland and RJ45 plug, 7 m	YCC02-RJ45M7
Connection cable for CAW*P (IP 44)	
Connection cable 25-pin D-SUB plug on Combics side	
- for printer YDP12/04IS, 9-pin D-SUB plug, 6 m	YCC01-01CISLM3
- for PC, 9-pin D-SUB socket, 6 m	7357314
- for Sartorius scales, 25-pin D-SUB plug, 3 m	YCCDI-01M3
- for various accessories, 25-pin D-SUB socket, 6 m	7357312
- for Sartorius scales, 12-pin round plug, 3 m	YCC01-02ISM3
- for various accessories and IS platforms, 12-pin round plug socket, 6 m YCC01-03CISLM3	
- open cable ends, 6 m	YCC02-RELAIS01
Connection cable from RS-232 data interface to USB interface on the PC, 25-pin D-SUB plug, 2 m	YCC01-USBM2

[1]) Suitable for use in zones 2 + 22

Documents List

Operating instructions

Basic application programs (option H0 and I2)	98646-003-22
Basic filling (option H3)	98646-002-18
Filling plus (option H4)	98646-002-23
ProControl terminal (option H6)	98646-002-34
UniCOM interfaces	98647-004-24
Standard field bus interface	98646-002-04
Verifiable alibi memory	98647-004-40

Installation Instructions

Use in Zone 2 and 22 potentially explosive atmospheres (option Y2)	98647-003-40

Sartorius Services

“Installation“ service in Germany

Our “Installation“ service package provides a range of important services that guarantee satisfactory work from your device:
- Installation
- Commissioning
- Inspection
- Instruction

You can request these services from our customer service using the “Installation Check No. 2“ in the included warranty and service check folder.

Re-verification in Germany

Scale verification for legal metrology is valid until the end of the calendar year after next.
If the scale is used for fill level control in accordance with legislation on prepackaging, verification is valid until the end of the following calendar year.
Re-verification must currently be carried out by a weights and measures official.
Re-verification should be requested in good time from the local Weights and Measures office.
As appropriate, please observe all statutory amendments.

Subsequent Verifications within European Countries

The expiration date of the verification depends on the national regulations of the country in which the weighing instrument is used. For information on verification and legal regulations currently applicable in your country, and to obtain the names of the persons to contact, please contact your local Sartorius office, dealer, or Service Center.

Further information concerning verification can be obtained from our customer service centers.

Declaration of Conformity

sartorius

CE

EG-Konformitätserklärung
EC Declaration of Conformity

Sartorius Weighing Technology GmbH
Weender Landstrasse 94 - 108
D-37075 Goettingen, Germany

erklärt in alleiniger Verantwortung, dass das Betriebsmittel
declares under own responsibility that the equipment

Geräteart: *Device type:*	**Combics Komplettwaagen** *Combics complete scales*
Baureihe / *Type series:*	**CAW1S, CAW2S, CAW3S, CAW1P, CAW2P, CAW3P, CAH1E, CAH1G, CAH3E, CAH3G**

in der von uns in Verkehr gebrachten Ausführung mit den grundlegenden Anforderungen der folgenden Europäischen Richtlinien übereinstimmt:
in the form as delivered complies with the basic requirements of the following European Directives:

Richtlinie 2004/108/EG *Directive 2004/108/EC*	Elektromagnetische Verträglichkeit *Electromagnetic compatibility*
Richtlinie 2006/95/EG *Directive 2006/95/EC*	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen *Electrical equipment designed for use within certain voltage limits*

Das Gerät erfüllt die anwendbaren Anforderungen folgender harmonisierten Europäischen Normen.
The apparatus meets the applicable requirements of the harmonized European Standards listed below.

1. Richtlinie 2004/108/EG / *Directive 2004/108/EC*
   EN 61326-1:2006 — Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen - Teil 1: Allgemeine Anforderungen
   Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements
2. Richtlinie 2006/95/EG / *Directive 2006/95/EC*
   EN 61010-1:2010 — Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen
   Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

Jahr der Anbringung der CE-Kennzeichnung / *Year of attachment of CE marking:* **12**

Sartorius Weighing Technology GmbH
Goettingen, 2012-05-03

i.V. Dr. Reinhard Baumfalk
Vice President R&D

i.V. Dr. Dieter Klausgrete
Head of International Certification Management

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten EG-Richtlinien, ist jedoch keine Zusicherung von Eigenschaften. Bei einer mit uns nicht abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit. Die Sicherheitshinweise der zugehörigen Produktdokumentation sind zu beachten.
This declaration certifies conformity with the above mentioned EC Directives, but does not guarantee product attributes. Unauthorised product modifications make this declaration invalid. The safety information in the associated product documentation must be observed.

SWT12CE017 | 65954-000-58-R01 | SOP-3.RD-045-fo2

CE Declaration of Type Conformity to Directive No. 2009/23/EC

This declaration is valid for non-automatic electromechanical weighing instruments for use in legal metrology. These weighing instruments accepted for legal metrological verification have an EC Type-Approval Certificate. The model(s) concerned is (are) listed below along with the respective type, accuracy class and EC Type-Approval Certificate number:

Model	Type weighing instrument	Type indicator	Accuracy class	EC type-approval certificate no.	Indicator test certificate no.
CAW...-.CE	SARTOCOMB	TA	(III)	T7884	D09-11.02

SARTORIUS Weighing Technology GmbH * declares that its weighing instrument types comply with the requirements of the Council Directive on non-automatic weighing instruments, no. 2009/23/EC of 23 April 2009; the associated European Standard "Metrological aspects of non-automatic weighing instruments," No. EN 45501; the most recently amended versions of the national laws and decrees concerning legal metrology and verification in the Member States of the European Union, the EU, and the Signatories of the Agreement on the European Economic Area, which have adopted this Council Directive into their national laws; and with the requirements stipulated on the Type-Approval Certificate for verification.
This Declaration of Type Conformity is valid only if the ID label on the weighing instrument has the CE mark of conformity and the green metrology sticker with the letter "M" stamped on it (the two-digit number in large print stands for the year in which the mark was affixed):

Example (date/year and number of the notified body may vary):

CE 12 0111 M

If these marks are not on the ID label, this Declaration of Type Conformity is not valid. Validity can be obtained, for example, by submitting the weighing instrument for final processing by an authorized representative of SARTORIUS Weighing Technology GmbH *.
The period of validity of this Declaration of Type Conformity shall expire upon any tampering with, repair or modification of this weighing instrument or, in some Member States, on the date of expiration.
This declaration applies only to the weighing instrument without peripheral devices.
The operator of this weighing instrument shall be responsible for obtaining an authorized renewal of the verification, such as subsequent or periodic verification, of the weighing instrument for use as a legal measuring instrument.

Sartorius Weighing Technology GmbH *
37070 Goettingen, Germany
Signed in Goettingen on 01 February 2012

i.V. P. Baumfalk

Dr. Reinhard Baumfalk
(Vice President R&D)

i.V. J. Rehwald

J. Rehwald
(Head of the Production Department
Mechatronics / Weighing Technology Division)

*) Sartorius Weighing Technology GmbH is the legal successor of Sartorius AG

LOP-3.225_an2e_2005.06.09.doc
P106eq01.doc

EC type-approval certificate

Number **T7884** revision 1
Project number 219470

Issued by	NMi Certin B.V. Hugo de Grootplein 1 3314 EG Dordrecht The Netherlands
In accordance with	The Council Directive 2009/23/EC on non-automatic weighing instruments.
Manufacturer	Sartorius Weighing Technology GmbH Weender Landstrasse 94 – 108 37075 Goettingen Germany
In respect of	A class (III) or (IIII), electronic, **non-automatic weighing instrument.** Manufacturer mark/name: Sartorius (Sartorius Weighing Technology GmbH is the legal successor of Sartorius AG) Type : SARTOCOMB
Characteristics	n ≤ the number of verification scale intervals mentioned in the test certificates. In the description number T7884 revision 1 further characteristics are described.
Valid until	14 February 2021
Description and documentation	The instrument is described in the description number T7884 revision 1 and documented in the test certificates involved.
Remark	This revision EC type-approval certificate replaces the earlier version, except for the documentation folder of the test certificates involved.

The Notified Body no. 0122
NMi Certin, 5 September 2011

C. Oosterman
Head Certification Board

NMi Certin B.V.
Hugo de Grootplein 1
3314 EG Dordrecht
The Netherlands
T +31 78 6332332
certin@nmi.nl
www.nmi.nl

This document is issued under the provision that no liability is accepted and that the applicant shall indemnify third-party liability.

The designation of NMi Certin BV. as Notified Body can be verified at http://ec.europa.eu/enterprise/newapproach/nando/

Parties concerned can lodge objection against this decision, within six weeks after the date of submission, to the general manager of NMi (see "Regulation objection and appeal against decisions of NMi" www.nmi.nl)

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INSPECTION
RvA I 122

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Prüfschein

Test Certificate

Ausgestellt für: *Issued to:*	Sartorius Weighing Technology GmbH Weender Landstr. 94-108 37075 Göttingen
Prüfgrundlage: *In accordance with:*	DIN EN 45501 (1992) Nr. 8.1, WELMEC-Leitfaden 2.1 (2001), Richtlinie 2009/23/EG, OIML R 76-1 (2006)
Gegenstand: *Object:*	Auswertegerät *Indicator* oder Anzeige- und Bedienterminal *or indicating and operating terminal*
Typ: *Type:*	TA
Kennnummer: *Serial No.:*	
Prüfscheinnummer: *Test Certificate No.:*	D09-11.02 1. Revision *D09-11.02 Revision 1*
Datum der Prüfung: *Date of test:*	
Anzahl der Seiten: *Number of pages:*	18
Geschäftszeichen: *Reference No.:*	PTB-1.12-4052216
Benannte Stelle: *Notified Body:*	0102

Im Auftrag
On behalf of PTB

Timo Schwabe
Timo Schwabe

Braunschweig, 03.08.2011

Siegel
Seal

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 40

Im Auftrag
On behalf of PTB

Dipl.-Ing. M. Link

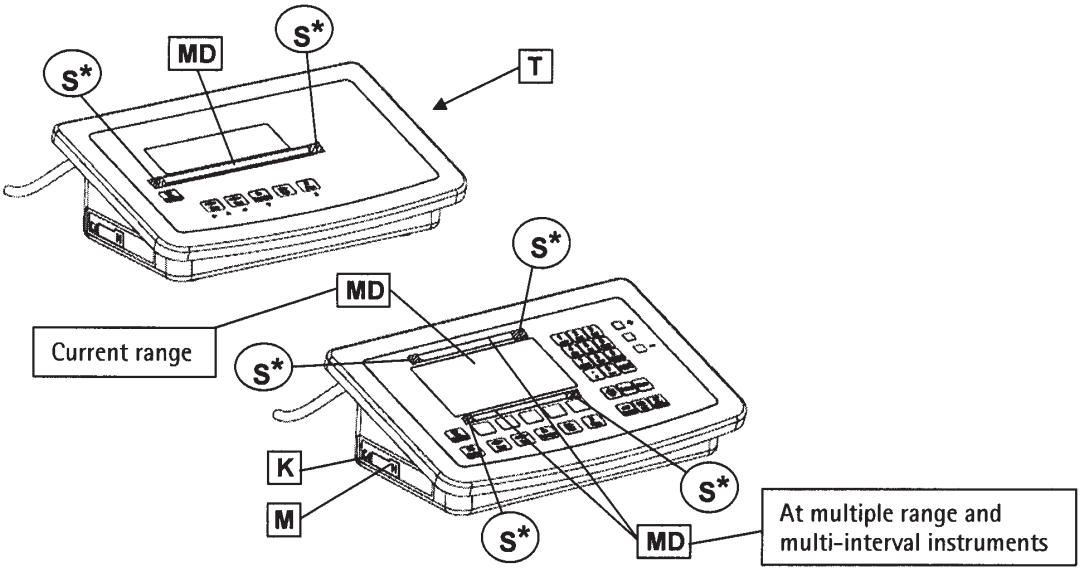
R3-0025 i

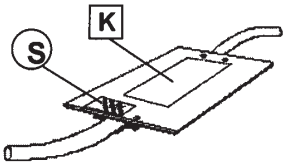
Prüfscheine ohne Unterschrift und Siegel haben keine Gültigkeit. Dieser Prüfschein darf nur unverändert weiterverbreitet werden. Auszüge bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

Test Certificates without signature and seal are not valid. This Test Certificate may not be reproduced other than in full. Extracts may be taken only with the permission of the Physikalisch-Technische Bundesanstalt.

Plates and Markings CAW...-.CE (Type SARTOCOMB)

- (S) Protective mark (self-adhesive mark or seal)
- (S*) Protective mark (self-adhesive mark or seal) , only for transferable labels (detachable labels that remain intact after removal)
- (S**) Protective mark (self-adhesive mark or seal), only in case of existent ADC
- (S***) Protective mark (self-adhesive mark or seal), only in case of existent approved data storage device.
- [K] Descriptive plate with CE konformity mark
- [M] green metrology sticker
- [MD] Metrological data Max, Min, e and if existent d
- [T] Plate with model designation

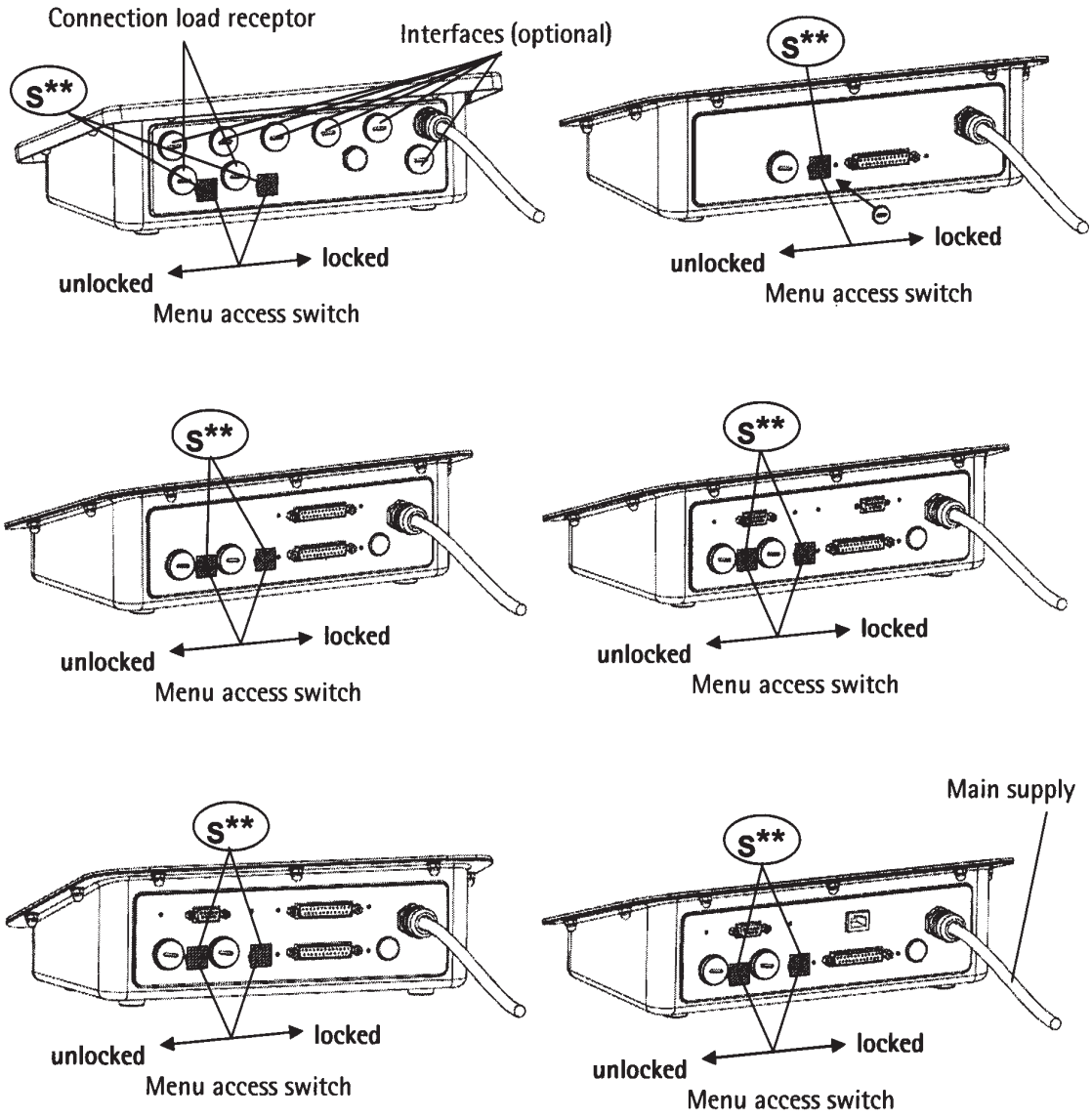




Alternative place for the descriptive plate

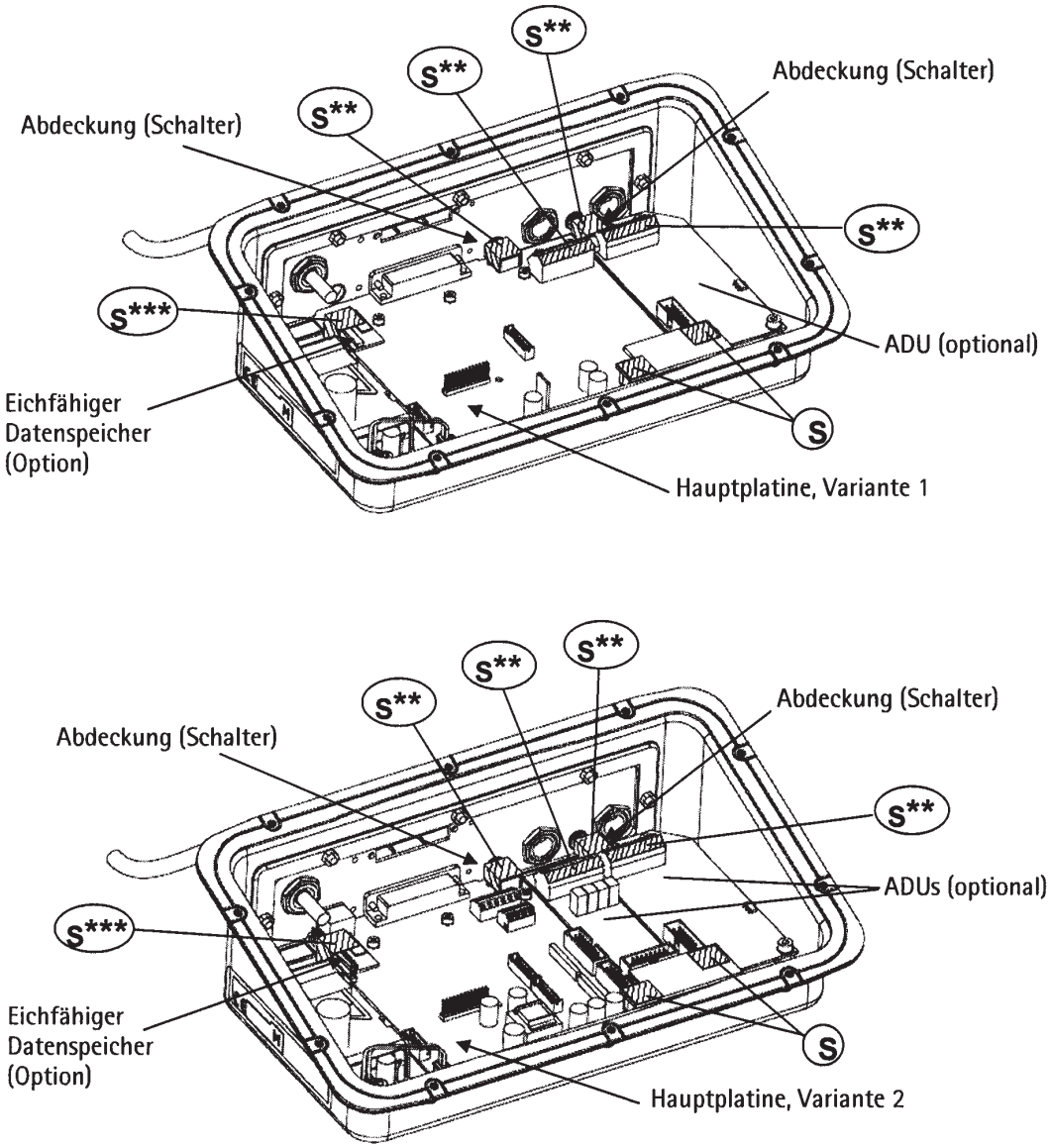
PPCA160111e

Type of weighing instrument: SARTOCOMB + Type of indicator: TA
EC type-approval certificate T7884 + test certificate D09-11.02



PPCA160111e

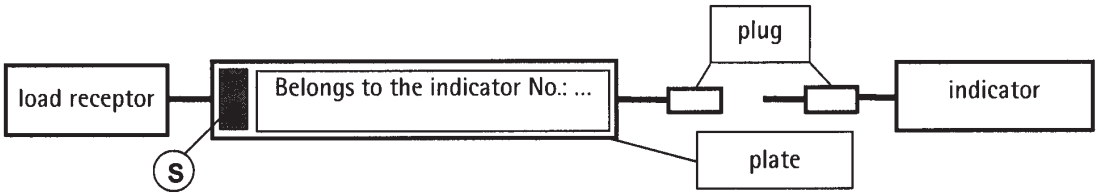
Type of weighing instrument: SARTOCOMB + Type of indicator: TA
EC type-approval certificate T7884 + test certificate D09-11.02



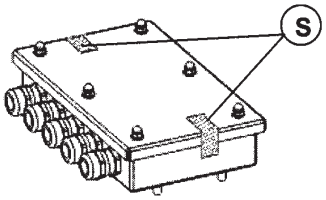
PPCA160111d

Typ Waage: SARTOCOMB Typ Auswertegerät: TA
EG Bauartzulassung T7884 + Prüfschein D09-11.02

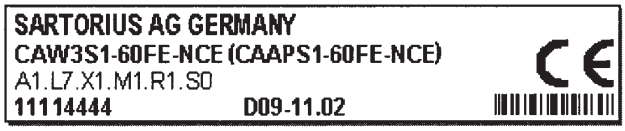
Alternative separable (disconnectable) plug connection between Indicator and load receptor.



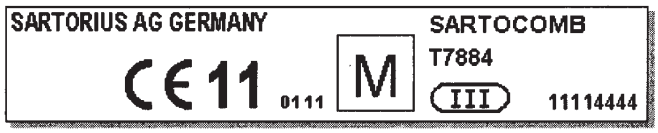
If a junction box is in existence between load receptor with strain-gauge load cells and indicator it has to be secured against inadmissible manipulation.



Example of plate with model designation T



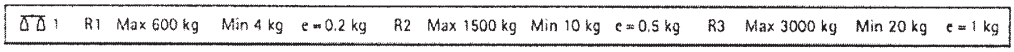
Example of descriptive plate on a weighing instrument already verified K



Examples of labels with metrological data MD

One range instrument

Three ranges instrument



Two-intervals instrument

Labels for entering metrological data

Example:

PPCA160111e

Type of weighing instrument: SARTOCOMB + Type of indicator: TA
EC type-approval certificate T7884 + test certificate D09-11.02

Appendix: Guide to Verification of Weighing Instruments

Evidence of compatibility for modules used with non-automatic weighing instruments

The documents required to verify a weighing instrument for legal metrology can be created using the data, documents, and programs available from the Sartorius website. The printout of the completed forms is valid as a model for verification of the weighing instrument produced by the scale manufacturer. Once this has been properly completed and signed by the weighing instrument manufacturer, it is submitted to the weights and measures officer together with the Declaration of Conformity (see "Declaration of Conformity" chapter).
Information important to the weights and measures officer may include the type approval certificate, test certificate or a test report. The test certificate and the manufacturer's information concerning the weigh cell will also be required.

Filling in the Evidence of Compatibility

▶ The Guide to Verification of Weighing Instruments, complete with Excel file, documents and information, is available from Sartorius on the Internet at: http://www.sartorius-mechatroncs.com/leitfaden_eichen/

Creating the Evidence of Compatibility without Internet Access

▶ You can order the "Guide to Verification of Weighing Instruments" on CD-ROM directly from Sartorius. Order address:

Sartorius Weighing Technology GmbH
Hotline Dept.
Weender Landstrasse 94-108
Goettingen, Germany
Phone: +49.551.308.4440
Fax (in Germany): +49.551.308.4449
www.sartorius-mechatronics.com

Procedure:

▶ Select the required language version by clicking on the corresponding language.
▶ Select the required indicator at the top of the page.

Using the program:

ReadMe file
Read this file before opening the Excel file.
The ReadMe file contains important information about using the Excel file, and offers important information on filling out the documents.

Documents
All documents relevant to the compatibility declaration of the indicator are available (please click on the appropriate links).

Start

▶ Click on “Start the Excel Program.”
▷ The Excel file automatically opens with the Excel program.
MS-Excel must already be installed on your computer. A dialog box for selecting macros opens.
▶ Click on the “Activate macros” button.
▷ Note: This window might not open, depending on the settings in your computer system.
▶ All fields on the “Data“ page (highlighted in yellow) must be filled out by a qualified person.
▷ A filled out sample document is available in the “Documents“ folder with explanations of the fields that are highlighted in yellow. Once the technical specifications provided by the manufacturer have been entered correctly, the program calculates all values automatically.

On the last page, the green or red fields show whether the components (indicator and weigh cell/s) are compatible:
– Red = incompatible
– Green = compatible

Note: A manufacturer of weighing equipment who configures a weighing instrument from individual components (indicator and weigh cell/s) is responsible for the specifications in the documentation.

▶ Once all data has been entered correctly (all fields on page 2 are green), print out both pages.
▶ The file can then be archived (for example, saved on the PC) under a name of your choice.
▶ Double-check the information and sign the data sheet.

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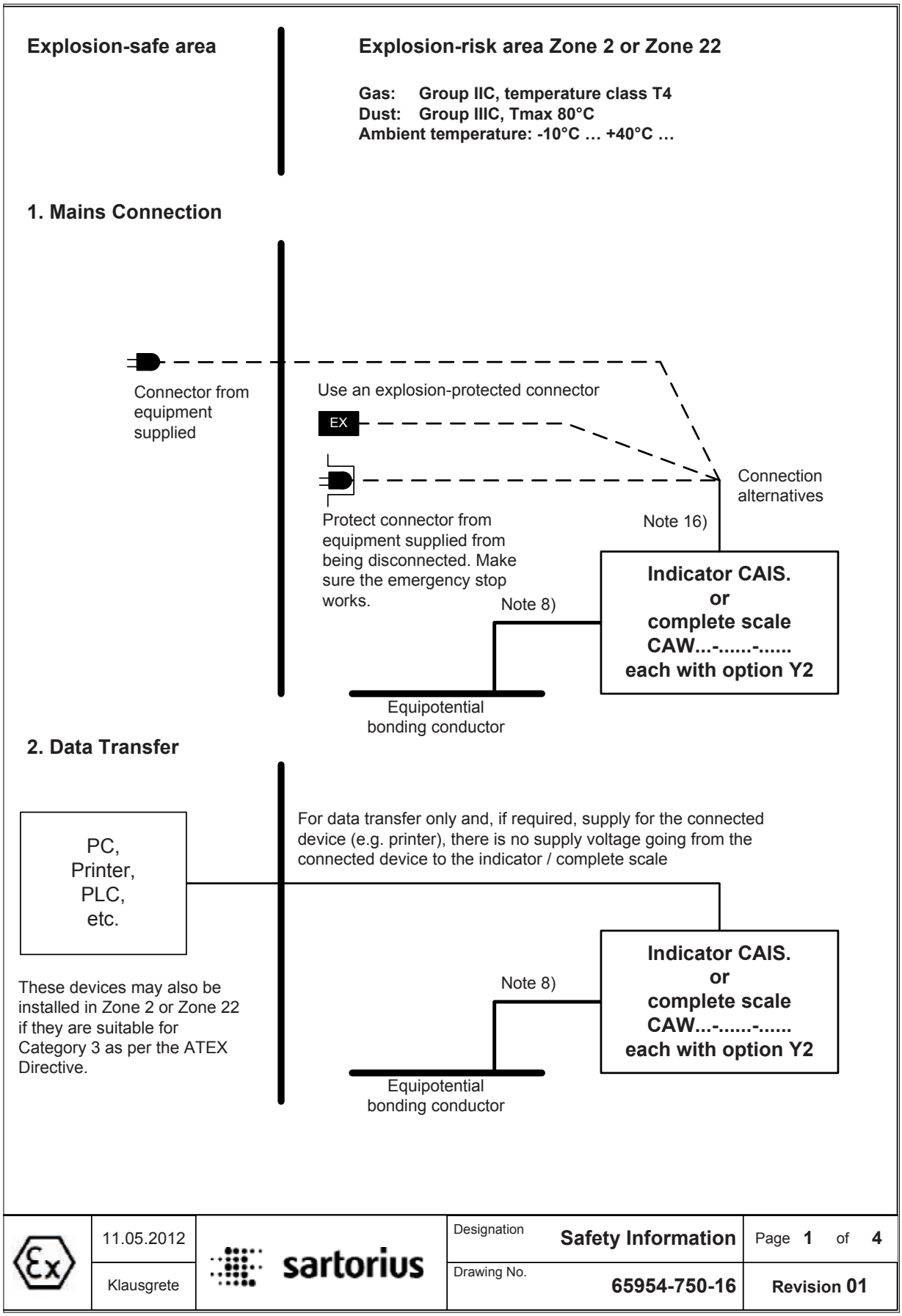
The Excel program used here was developed by the German Association of Metrology and Calibration (Arbeitsgemeinschaft für Mess- und Eichwesen (AGME)). It is also available as freeware on the Internet. The program is copyrighted and may not be modified. Users shall be liable for the improper use of said software.


Explosion-safe area
Explosion-risk area Zone 2 or Zone 22
Gas: Group IIC, temperature class T4
Dust: Group IIIC, Tmax 80°C
Ambient temperature: -10°C … +40°C …
1. Mains Connection
Connector from equipment supplied
Use an explosion-protected connector
EX
Connection alternatives
Protect connector from equipment supplied from being disconnected. Make sure the emergency stop works.
Note 16)
Note 8)
Indicator CAIS. or complete scale CAW...-.....-..... each with option Y2
Equipotential bonding conductor
2. Data Transfer
PC, Printer, PLC, etc.
For data transfer only and, if required, supply for the connected device (e.g. printer), there is no supply voltage going from the connected device to the indicator / complete scale
These devices may also be installed in Zone 2 or Zone 22 if they are suitable for Category 3 as per the ATEX Directive.
Note 8)
Indicator CAIS. or complete scale CAW...-.....-..... each with option Y2
Equipotential bonding conductor
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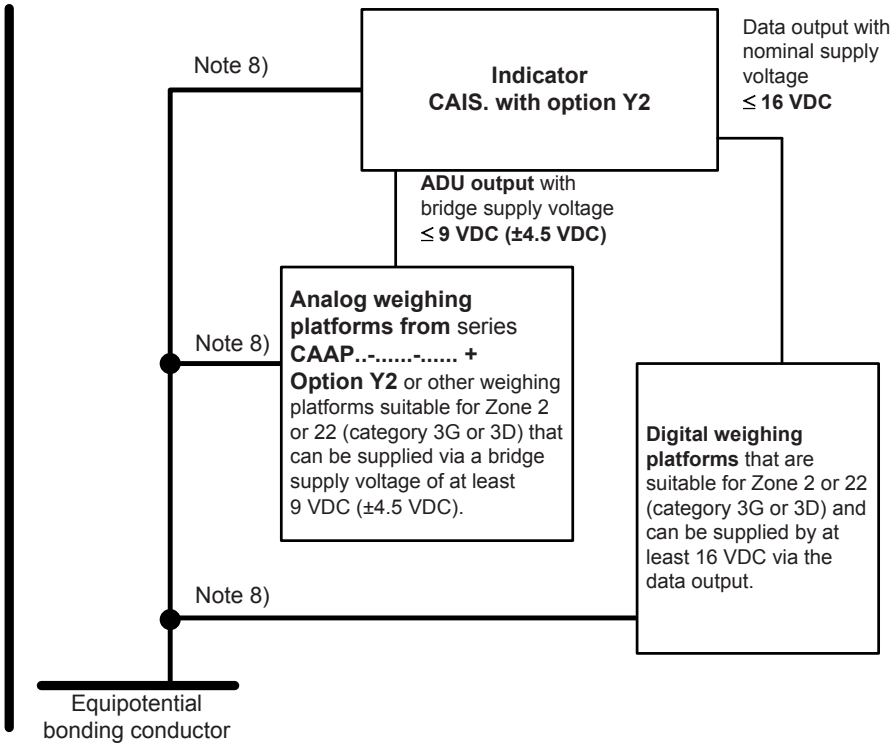
Explosion-safe area

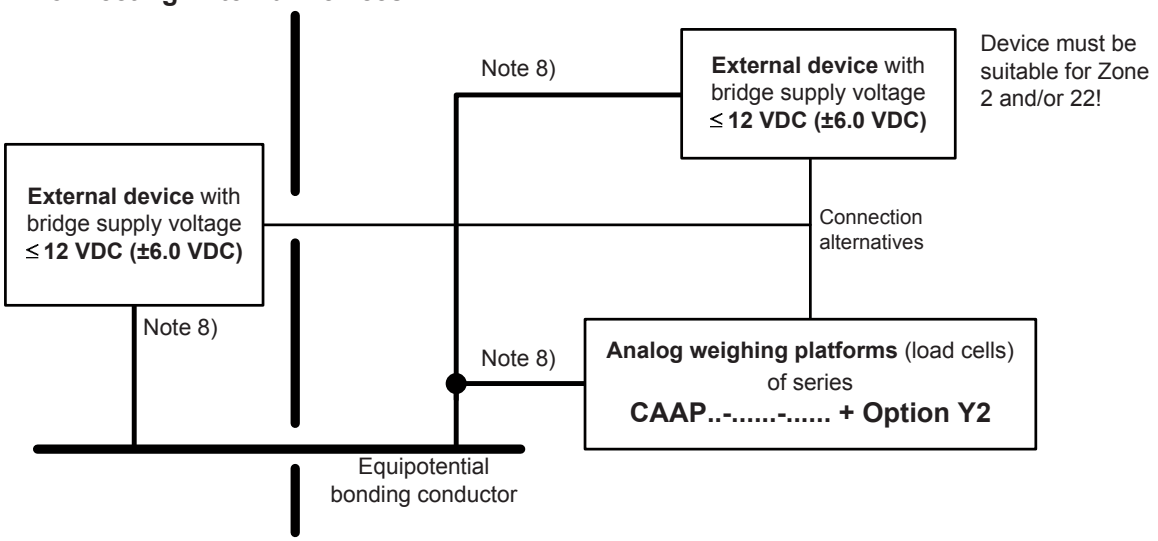
Explosion-risk area Zone 2 or Zone 22

Gas: Group IIC, temperature class T4
Dust: Group IIIC, Tmax 80°C
Ambient temperature: -10°C … +40°C

3. Connecting Weighing Platforms


Note 8)
Indicator
CAIS. with option Y2
Data output with nominal supply voltage
≤ 16 VDC
ADU output with bridge supply voltage
≤ 9 VDC (±4.5 VDC)
Note 8)
Analog weighing platforms from series CAAP..-.....-..... + Option Y2 or other weighing platforms suitable for Zone 2 or 22 (category 3G or 3D) that can be supplied via a bridge supply voltage of at least 9 VDC (±4.5 VDC).
Digital weighing platforms that are suitable for Zone 2 or 22 (category 3G or 3D) and can be supplied by at least 16 VDC via the data output.
Note 8)
Equipotential bonding conductor

4. Connecting External Devices


Note 8)
External device with bridge supply voltage
≤ 12 VDC (±6.0 VDC)
Device must be suitable for Zone 2 and/or 22!
External device with bridge supply voltage
≤ 12 VDC (±6.0 VDC)
Connection alternatives
Note 8)
Note 8)
Analog weighing platforms (load cells) of series
CAAP..-.....-..... + Option Y2
Equipotential bonding conductor

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These safety instructions apply to installation, use, maintenance and repair

1. The device (CAIS. indicator, CAAP weighing platform..-……-……, CAW complete scale…-……-…...) is suitable for use in potentially explosive atmospheres of **Zone 2** (Group IIC, temperature class T4 or T6 for weighing platforms) and **Zone 22** (Group IIIC; surface temperature 80°C) according to EU Directive 94/9/EC and applicable harmonized European standards. This does not guarantee compliance with other properties and requirements.
2. The device may only be used indoors.
3. Do not use it as a portable instrument.
4. Installation, operation, maintenance and repairs should only be performed by an authorized specialist, in accordance with applicable laws, rules and regulations, ordinances and standards. Particular attention should be paid to Standard EN 60079-14 within the scope of validity of EU Directive 94/9/EC for the installation. Installation, maintenance, cleaning and repair work may only take place with all power disconnected from the device and any connected peripheral devices.
5. It is essential that recommendations on the installation, operation, maintenance and repair contained in the operating instructions supplied are complied with for all equipment (including connected devices). The temperature ranges of connected devices must also be taken into account.
6. The device should only be used in a temperature range of **-10°C … +40°C,** do not expose it to unacceptable sources of heat or cold, direct sunlight, UV radiation, shocks or vibrations, and the installation should ensure that heat can be properly dissipated and external heat sources are kept at a sufficient distance.
7. Tighten the cable entry glands using a torque of 5 Nm. The cable gland for the power cord should be tightened with a torque of only 3 Nm. Install the external connecting cables firmly to avoid damage and strain. The cable connections inside the explosion-risk area must be secured against loosening.
8. All metal parts must be electrically connected to the same equipotential bonding conductor (PA) so that any electrostatic charges can be conducted away from the equipment. For this purpose, the equipment operator is obligated to connect a lead with a gauge of at least 4 mm² (cross section) to the equipotential bonding terminal (indicated by the ground symbol) located on the housing. A suitable ring terminal must be attached to the end of the cable. The cable must be laid so that the ground connector cannot come loose. The connection to the equipotential bonding conductor should be checked to see if it is of low resistance at the time of installation and at regular intervals. The indicator and weighing platform must each be connected individually to the equipotential bonding conductor if no metal connection (e.g. support arm) is used between them. Do not use the shield of the connection cable for the equipotential bonding conductor.
9. Before opening devices, switch off the supply voltage, or make sure that the area is not potentially explosive. Do not connect or disconnect any live cables inside an explosion-risk area.
10. When closing, make sure the cover screws are tightly secured.
11. The device should only be operated for the first time when it is certain that the area is not potentially explosive.
12. Data lines to connected devices and the connection cable to the weighing platform should be secured against accidental disconnection and may only be connected and disconnected when the power supply is turned off. Block unused outlets to guarantee the IP 65 level of protection. Keep any transitory voltage phenomenon away from the device.
13. Data cables are for data transfer only and may not supply any power from the connected device to the indicator / complete scale. However, one digital weighing platform suitable for use in Zone 2 or 22 connected to the data output can be supplied via direct voltage if it can be supplied by direct voltage of at least 16 VDC via the data output.

14. During installation, take suitable steps to prevent stray electrical interference (e.g. due to magnetic fields). Keep any voltage transients away from the device.
15. The indicator (indicator of the complete scale) should be installed so that there is only a low risk of mechanical danger to the IP protection. The IP protection rating of the device is IP6x according to EN 60529 / IEC 60529. The device is designed for clean environments and must be handled carefully according to the IP protection rating.
16. The power connection must be made in accordance with the regulations applicable in the country of operation. A correct power connection must be ensured. The power supply cable should be protected against damage and properly connected to the power supply (**100 - 240 VAC, ± 10%**, 50-60Hz) or **24 VDC (± 10%)** for Option L8**.** The indicator and/or complete scale is approved for circuits up to 1500 A. Only use the power supply connection cable in the hazardous area with a suitable and approved explosion-protected plug. Alternatively: Protect connector from being disconnected or attach the power supply connection cable directly. Be sure to provide a suitable emergency shut-off switch.
17. Avoid generating static electricity. Only use a damp cloth to clean the device. This is especially true when using a dust cover. The equipment operator assumes responsibility for preventing any risks caused by electrostatic charging.
18. If cables are connected subsequently, make sure that the connections are not corroded. The grounding conductor of a mains connection cable must have the same cross section as the current-carrying wires (N and L).
19. All external cables (even cables between load cells / weigh cells and connection box / junction box) are only suitable for fixed placement and must be laid fixed. Otherwise, use screwed connections designed according to EN60079-0 and rounded at an angle of 75º (minimum) and a radius at least equal to one-quarter of the diameter of the cables, but without exceeding 3 mm.
20. Cables from third-party manufacturers (subject to the user's responsibility) must be tested for suitability according to Appendix A EN 60079-0. Pay attention to the pin assignment. Pay attention to the wiring diagram. Remove unneeded connections.
21. Unused openings must be sealed using suitable cover caps (dummy plugs) to ensure their IP protection rating. Do not remove while it is carrying current.
22. When using external devices in Zone 2 hazardous areas, pay attention to the gas group and temperature class. The outputs must include the Ex nA electrical circuits. Pay attention to the maximum surface temperature and group for Zone 22.
23. Chemicals that can attack housing gaskets and cable sheathings must be kept away from the device. These include oil, grease, benzine, acetone, and ozone. If you are uncertain, contact the manufacturer.
24. The installation must be inspected for correct function and safety by a trained and qualified person at appropriate intervals.
25. If the installation does not operate properly, disconnect it from the supply voltage immediately and secure it against further use.
26. In the event of repair, use only original spare parts supplied by the manufacturer.
27. Any modifications to the instrument (except by persons authorized by Sartorius) cause loss of conformity for use in Zone 2 and Zone 22 explosion-risk areas and invalidate all guarantee claims. Similarly, the device may only be opened by qualified and authorized personnel.
28. Modifications (also those by Sartorius personnel) are subject to written approval.
29. These instructions are given in addition to those in the instruction manuals and do not release the operator from his responsibilities for the installation, operation and inspection of the equipment in compliance with any applicable regulations in the country of use.

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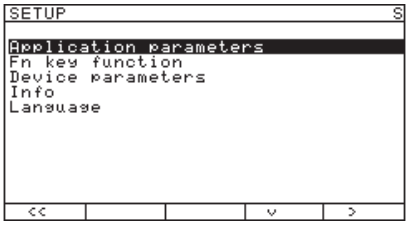
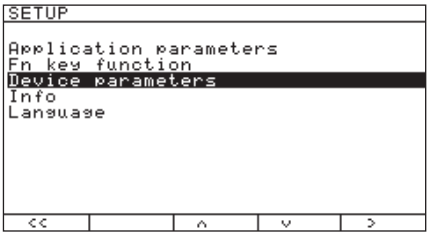
Appendix: Passwords

Service Password

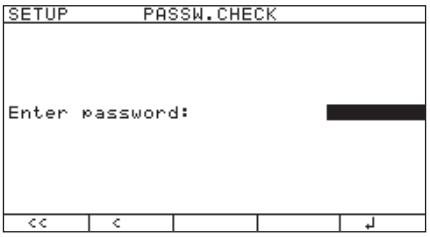


- ▶ Press [I/⏻] to turn on the device.
- ▷ When turned on the scale is in an application program.
- ▶ Enter the service password and confirm with the [SETUP] key.
- ▷ The device in now is Service mode. An "S" appears in the top right-hand corner of the display.

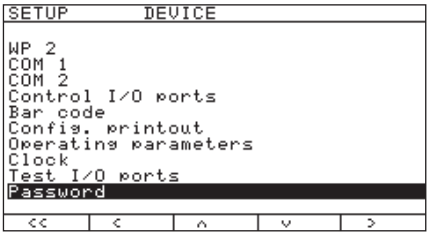
General Password



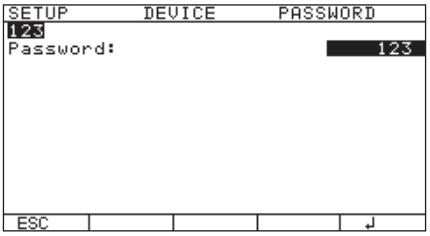
- ▶ Press [SETUP].
- ▷ The menu appears on the display.
- ▶ Press the "v" soft key several times to select the "Device parameters" line (or "Application parameters").



- ▶ Press the ">" soft key.
- ▷ The Access window appears on the display.
- ▶ Enter the general password (see below) via the keypad, see "Numeric Input via the Keypad."
- ▶ Press the "↲" soft key.



- ▷ The device selection appears on the display.
- ▶ Press the "v" several times to select the "Password" line.
- ▶ Press the ">" soft key.



- ▷ The input line appears on the display.
- ▶ Read the old password, or enter a new password (max. 8 characters).
- ▶ Press [·] or [CF] several times to delete the password.
- ▶ Press the "↲" soft key to save the delete.
  If not yet saved, the process can be canceled using the "ESC" soft key.

- ▶ Press [SETUP] or "<<" to exit the Setup menu.
- ▶ Press [I/⏻] to turn off the device.
- ▶ Press [I/⏻] turn the device back on.

Service password:
202122

General password:
40414243

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